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Technology and Ethical Idealism : a History of Development in the Netherlands East Indies

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Suzanne Moon

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CNWS

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A History of Development in the Netherlands East Indies

Studies in Overseas History / 9

TECHNOLOGY AND ETHICAL IDEALISM

To my sister Mary,

for all her support

TECHNOLOGY AND ETHICAL IDEALISM

A History of Development in the Netherlands East Indies

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Technology and Ethical Idealism: A History of Development in the Netherlands East Indies

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CONTENTS

List of Illustrations

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Introduction

In the Netherlands East Indies, technological development emerged as a central concern of colonial political life during the last forty-two years of Dutch rule (1900-1942). The idea that on-going technological change directed at improving the welfare of certain groups in society was essential for the nation's well-being played a profoundly important role in twentieth-century Indonesia. From the late colonial period to the present, this idea has informed political discourse--from villages to the state--and shaped Indonesians' social and material existence. From small, local projects to national transformations as dramatic as that brought about by the Green Revolution, technology has become a key medium for defining and building a relationship between the state and the Indonesian people. This book investigates the foundations of developmentalist thinking that shaped the turn-of-the-century colonial reforms called the Ethical policies, and it explores the mutual interaction of Ethical idealism, day-to-day colonial politics, and technological practices that produced a heightened political commitment to, and the institutionalization of, technological development.

Because "development" carries a broad range of meanings, it is useful to clarify how the term is used in this study. When I refer to development programs, I do not mean just any state-driven, technological program intended to make the colony more productive or useful. Rather, I mean those efforts that were specifically meant to improve the lives of indigenous people in the Indies. Such projects were at various times called social welfare projects and "the development of the native peoples."[1] In each case, providing some kind of improvement to indigenous society was a central, not incidental, goal of the work.

Development programs emerged in the context of the Ethical policies in the Netherlands Indies, which were a set of reforms resembling the "civilizing missions" undertaken by other colonial powers during roughly the same period. The story of technological development in the service of social welfare offers insight into both the political significance of technology and the technological and material significance of politics in Dutch and Indonesian history. Colonial officials used technology to embody Ethical idealism, while some rural people responded to and reshaped those efforts. Indeed, this story offers an opportunity to expand our understanding of the significance of Ethical thinking among indigenous people because it provides a window into rural communities far from the urban centers that are the focus of most studies of Indonesian political and social change (Shiraishi 1990; Blumberger 1931). Indigenous farmers' response to Ethically inflected efforts suggests what value indigenous communities assigned to development programs and the accompanying Ethical baggage. Local peoples critically, if subtly, influenced

the colonial experts who worked with them and ultimately shaped expert thinking about what direction development should take in the Indies. Over time, this mutual interaction created "best practices" of development that reinforced some aspects of Ethical thinking, materializing them in technological form, and discarded others. The history of technological development therefore helps expose the dynamism of Ethical thought and its changing influence on the day-to-day practices of a set of colonial experts and the farmers with whom they worked. While most histories emphasize the declining influence and abandonment of Ethical idealism in the early 1920s in the face of growing indigenous political unrest (Ricklefs 2001: 206-246; Shiraishi 1990: 216-238), technological development projects continued to draw on this otherwise abandoned philosophy, suggesting an unexpected vitality in Ethical reforms.

Because development aimed to change the daily lives of individuals in certain segments of Indies society, it is vital to investigate not just the technologies, but also the technologically mediated relationships that colonial development programs put into place. As historical studies have shown, Ethical reforms aimed to establish a new kind of relationship between the state and the indigenous people, one in which Europeans imagined themselves as tutors, bringing "natives" into the ways of the modern world and a fuller partnership in the colonial enterprise.[2] Opening schools, providing agricultural extension services, expanding press freedoms, and even encouraging certain sorts of political organization all became hallmarks of the early Ethical period (Furnivall 1944; Locher-Scholten 1981). Such rhetoric of European guidance and tutelage, along with the introduction of Western technical artifacts, formed a fundamental part of most civilizing mission ideologies (Adas 1989: 199-342). "Native development" programs based on Ethical ideals therefore did more than simply drop new technologies into the colony; they also constructed a relationship with the indigenous people who were meant to serve as on-going conduits for Western technologies and techniques. In the Indies, Ethical reformers cared as much about establishing a trusting, "close contact" with indigenous people as they did about specific technological interventions. Indeed, most experts in the Indies agreed that long-lasting development in the absence of such a relationship was impossible. The mutual interactions of experts and indigenous participants defined the contours of this relationship over time, ultimately shaping the enduring political and technological practice of development in the Indies.

As this book will show, the Ethical requirement of a development relationship based on close contact had profound consequences for both the technical practice of development and the material life of Indonesia's rural people. Dutch experts, who saw both technical change and close contact as requirements for true development in an indigenous society, embraced small-scale development projects attuned to the social, economic, and ecological differences across the colony, eschewing larger, showier projects as ineffective or even potentially damaging. This is not the story that existing literature might lead us to expect. Many studies of colonial technology have given the most attention to ambitious, large-scale projects that became monuments to

colonial power, and not infrequently, colonial disregard for local practices and knowledge.[3] The Dutch were certainly no less ambitious in their desire for change than other colonial powers, and they undertook their share of large technical projects during their years in power. Yet the "development of the native peoples" took an entirely different direction, consistently favoring the small over the large. This book explores why the scale of technological change became an issue for experts working in development programs, highlighting the ways that Ethical politics and technological practices interacted to produce this unexpected outcome.

Scale, as used in this study, refers not just to the absolute size of an artifact – a dam versus a seed, for example – but also to the scope of application for a single given technology or technique. Therefore, even a seemingly modest technology applied homogeneously across a large population is considered a large-scale technology. For example, a dam that was intended to produce development by improving the water supply for a large number of farmers is certainly a large-scale technology, but so is the introduction of the export production of a single crop over a large region, even when individual farmers might work those crops on small plots of land. Small-scale technologies for my purposes are both physically small, like seeds or plows, and tailored to apply to a relatively small region. The agricultural extension service in the Indies promoted improved rice production across a broad area, but they did so using heterogeneous solutions, each of which extension specialists considered applicable to only a small area, sometimes no more than a few villages. They sought not a few, broadly applicable solutions, but many solutions, each one attuned to local circumstances. The Dutch colonial government not only endorsed this approach; they considered it the gold standard for development practice.

Small-scale development projects, particularly sensitivity to ecological conditions, did play a role in other parts of the colonial world as well (Tilley 2003: 109-130, Anker 2001). Historians, however, have given the most attention to large-scale projects undertaken by colonial authorities who had little respect or regard for common local practices, and who held naïve beliefs about the consequences of their interventions for indigenous society (Headrick 1988; Scott 1998). Historical interest in these large-scale projects is hardly surprising. They underscore the ambitions of colonial authorities and highlight the visions that authorities entertained for making colonies docile, productive, and efficient according to Western definitions of those terms (Adas 1989: 199-270). Dams, roads and railroads, educational systems, colony-spanning geographical surveys, and the transformation of a region's agriculture to one or two export crops had enduring and often highly visible consequences long after decolonization, highlighting the legacy of the colonial past. When civilizing missions enter such accounts, it is usually to point out the disjunction between the colonizers' claims that such projects were meant to benefit colonized peoples and the reality that key benefits usually accrued only to colonial elites. Civilizing missions in this type of narrative matter mainly for their rhetorical significance, as a justification for colonial rule that obscured the colonizers' exploitative motives.

A subset of the large-scale technology projects taken up in the historical literature consists of those that historical actors defined primarily as social improvement projects. These include, for example, the development of technical education programs (Kumar 1995: 216-232), public health measures like vaccinations (Arnold 1993), and agricultural and forest improvement schemes (Peluso 1992; Rajan 2006). In histories of these projects, ideologies of development emerging from civilizing missions play a more central role, although the authorities' self-interested motives are usually clearly evident. Highlighting the cultural and social differences and distance between colonial authorities and indigenous people, these studies emphasize the conflicts resulting from the radically different world views held by the two groups. Specifically, they show how colonial authorities, in defining the problems of indigenous society and formulating solutions, willfully or carelessly disregarded local knowledge and practices. Agriculture projects offer a classic example of this disregard, as colonial authorities dismissed indigenous practices of "messy" multiple cropping and tried to educate indigenous peoples to organize their fields in rows, or grow one crop or another more intensively, optimizing for higher yields. Scholars have since found that indigenous practices often fit both local ecologies (like water supply and soil type) and local economies far better than those promoted in state interventions (Richards 1985; Scott 1998). Public health projects ran aground on indigenous peoples' resistance to Western approaches to medical treatment (Arnold 1993). European or American improvers, operating according to their own preconceived and (often) locally inappropriate ideas of how to increase productivity, usually created more problems than they solved (Adas 2006).

The best of these histories explore the deeper reasons that colonizers continued such projects despite the discouraging and sometimes disastrous results. One of the most penetrating investigations of these reasons comes from James Scott, whose book *Seeing Like a State* (1998) argues that a combination of authoritarian rule, a blindness and disregard of all forms of knowledge except those validated by Western science, and the state's overriding need to make its people and production legible to the state produces the sorts of "improvement" projects that are disastrously inappropriate for the societies and ecologies in which they are put into place. A classic example was the Tanzanian groundnut scheme, in which authorities attempted to monocrop valuable groundnuts on a massive scale, ignoring the practices of local farmers that might have made clear that the soil and water in the region would never sustain such intensive practices. Favoring instead the claims of a group of scientists who had little familiarity with the region, authorities moved forward with the project. Not only did the Tanzanian groundnut scheme fail to produce groundnuts in any quantity, it also alienated farmers from lands which had always yielded a respectable living (Scott 1998: 228-229). Other stories show how colonial fiscal interests overrode any desire to understand the logic of local practices, producing significant conflict between authorities and indigenous people. In the Indies, for example, foresters disregarded

all local logic of forest use and justified the often brutal treatment of indigenous people in the name of "improving" the forests, that is, making them productive according to the needs of the state (Peluso 1992; Rajan 2006).

While studies of large-scale technological interventions offer useful insight into the aggressive transformations of societies and ecologies made under assumptions of Western cultural and technical superiority, they do not tell the entire story of state-driven technological change in colonies. In the Indies, while high modernism came into play for certain technology projects (Peluso 1992, Tagliacozzo 2005: 306-328), experts involved in social welfare soundly and consistently rejected it. The central problem motivating development, as Scott shows, was the difference between the ordinary ways of life of the indigenous people and the needs of the state. Indies colonial authorities embraced multiple strategies to manage that difference, including both the willful simplifications of high-modernism and the small-scale, tailored efforts favored by the Department of Agriculture. State-driven technological change in the Indies, and likely elsewhere (Biggs 2008), was therefore not simply a case of high modernist bullying run amok, but a more complicated affair in which compulsion, persuasion, and large-scale and small-scale technologies each played a part.

Pointing out that colonial development experts sometimes sought willing cooperation and employed persuasion rather than compulsion in Indonesian development is not to dismiss as unimportant colonizers' arrogant and often violent behavior when engaged in other technology projects. Nor is it to suggest that all development projects operated in perfect harmony with the indigenous people and the ecologies of the Indies. Conflict, although often less intense than in large-scale projects, remained a normal part of what were, after all, top-down efforts for change. This study, however, highlights the mutual interaction of the political and technical factors that made a small-scale, locally sensitive approach to technical change politically viable in the Indies and offers insight into the reasons that persuasion rather than compulsion became the rule for Native development.

That the politics of technological scale in Indies development programs seems surprising is due largely to the way that small-scale technologies usually enter the history of twentieth-century colonial and post-colonial development projects. In general, historians have paid the most attention to those small-scale projects that represented a challenge to colonizers or post-colonial, Western-oriented, central governments. Gandhi's village development projects (1922; 1948), and E. F. Schumaker's calls for intermediate technologies "with a human face" (1973) both critiqued the effectiveness and desirability of the grand-scale works that centralized authorities often favored. Small-scale technologies have acquired anti-state (or at least, anti-centralizing authority) credentials. Yet this book, along with other recent literature, suggests a more complex genealogy to the uses of small-scale technologies in development, reminding us

not to thoughtlessly read a politics of decentralization or anti-colonial resistance into small-scale development projects (Tilley 2003; Sackley 2004). In the Indies, small-scale, locally sensitive technological development emerged not despite colonial rule, but because of it.

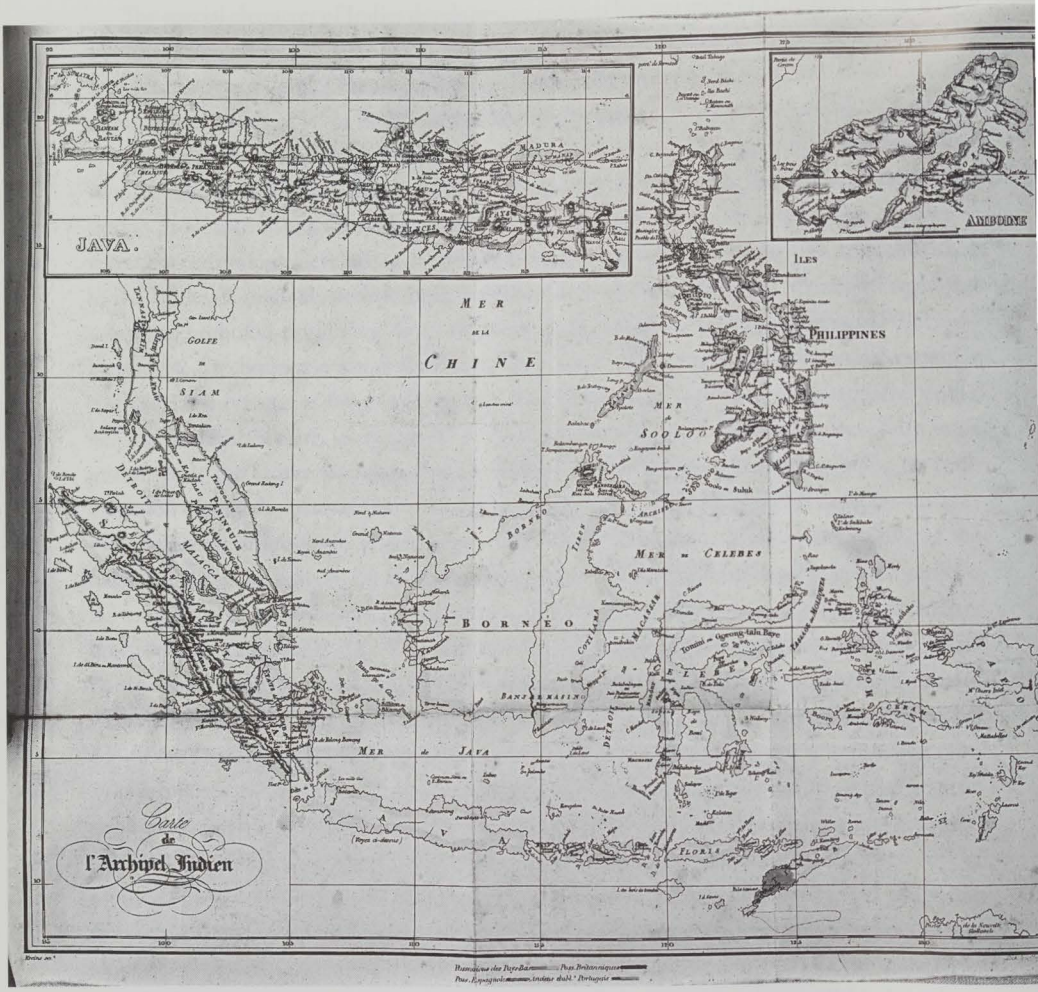
The special character of Indies development projects has not gone unremarked in the scholarly literature, although its political and technical origins, as well as its significance for the broader history of development, have not yet been fully explored. J. A. A. van Doorn offers a thoughtful analysis of what he labels the "social-economic" efforts of the Indies Department of Agriculture officials, which he contrasts with the "technocratic" approach taken by irrigation officials in the Department of Public Works (1994: 105-244). Van Doorn's categorization is provocative, but upon deeper consideration tends to obscure rather than clarify the ways that technology, development, and politics, especially Ethical politics, became connected in the Indies during this period. Both irrigation and agriculture services advocated technical solutions; both had prominent, but not dominating political roles in the Indies bureaucracy. Neither had technocratic power in the strongest sense of the term, where technical expertise is a crucial prerequisite for exercising any kind of political authority. Both agencies could be, and sometimes were, overruled by competing, non-technical authorities, including most prominently the Governor-General of the Indies and the Minister of the Colonies. Yet both irrigation and agriculture services had strong commitments to finding technological solutions to complex social problems, making them identically technocratic in the weakest sense of the term. Labeling Department of Agriculture projects as "social-economic" and irrigation projects as "technocratic" tends to mask the reality that all agricultural development projects, no matter how modestly designed and locally sensitive, were technological interventions aiming at material change. Similarly, all irrigation projects, no matter how large and technically sophisticated, were designed around assumptions about the social order of the colony. Therefore, rather than adopt Van Doorn's categorical distinctions, this book draws on the insights of sociologists like Wiebe Bijker and Trevor Pinch, who argue that all technologies and technological change need to be understood as sociotechnical, that is, as inextricable combinations of social and technical (Bijker 1995; Pinch and Bijker 1989). Fully acknowledging the debts this study owes to Van Doorn's analysis, it nevertheless takes a somewhat different course, by investigating the sociotechnical character of development technologies, especially the ways these technologies and ideals of development were embedded in the colony's broader political life. While the techniques and ideals of development that emerged confounded the early expectations of Ethical thinkers, what became the widely accepted best practices of small-scale development nevertheless owed a significant debt to Ethical idealism.

This book is centrally concerned with the mutual interaction of the technological and political choices that produced the Dutch approach to development. It does not engage questions about the long-term economic consequences of development in Indonesia, a subject for which there exists a rich literature of outstanding quality.[4] It is my hope that this book will comple-

ment the larger economic history literature, providing insight into the political and ideological foundations and commitments of development and underscoring the multiplicity of factors that contributed to the enduring appeal of technological development in the Netherlands East Indies.

A map of the East Indies c. 1824.

Source: Thomas Stamford Raffles, *History of Java* (1824, French Edition). Courtesy Southeast Asia Visions Collection, Cornell University Library



A map of the East Indies c. 1824.

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1

"Promoting Improvement and Advantage": Social Welfare and the Emergence of Technological Development

Well before the Ethical era, colonial governments of the Netherlands East Indies had concerned themselves with the prosperity of the indigenous people. The idea of native development that emerged in the early-twentieth century had its roots in long-existing colonial debates about the economic circumstances of the indigenous peoples of the islands. These debates consistently returned to two key questions: Would the indigenous people, and the colony as a whole, be better off if indigenous people adopted European economic habits? And, should the colonial government actively intervene either to preserve "traditional" indigenous society or, alternatively, to encourage widespread change? Because the colonial government organized the colony according to the racialized legal categories of European, Chinese, and Native, a politics of identity informed these disputes, and ultimately the ways that later development projects came to be aimed primarily at "Natives" rather than at the broader multicultural population of the Indies.

"Promoting Improvement and Advantage"

In 1811, a British military force took control of Java, expelling the French, who had annexed the Netherlands years earlier, and who under Napoleon's rule posed a serious threat to British shipping power in the region. The British authorities installed as Lieutenant-Governor Thomas Stamford Raffles, a well-regarded administrator with experience in Penang and Malacca. Over the course of roughly 200 years, the VOC (the Dutch East India Company, or *Vereenigde Oost-Indische Compagnie*) had slowly expanded their role from that of mere traders in a foreign land, to de facto (and sometimes de jure) rulers over territories in the archipelago, especially on the island of Java (Ricklefs 2001). The French and Dutch authorities had maintained these territorial interests even after the VOC's demise in 1799. Raffles aimed to build a unified and consistent administrative infrastructure on the piecemeal foundation of VOC and French practices. His goal was to expand British imperial control in the archipelago and establish free trade in a region long monopolized by the Dutch (Raffles 1835: vol. 1, 74-80; Milton 1999).

Raffles's desire to open up Java to trade, especially for British traders, is hardly surprising. Yet, for Raffles and other advocates of Liberalism, free trade carried benefits not just for foreign merchants, but for all the people of the Indies because it allowed anyone to engage in profitable trade. In this way of thinking, the right kind of exploitation would produce a society that was both just and prosperous; it would "promote improvement and advantage in the Malay nations" (Raffles 1835: vol.1, 89). Raffles criticized the monopolistic practices of the Dutch, which in his view had produced a disgruntled population, whose inevitable turn to banditry made long-distance trade increasingly risky. The resulting colonial environment was both morally and practically bankrupt:

> [T]he commercial policy adopted by the Dutch [. . .] was not only contrary to all principles of natural justice, and unworthy of any enlightened and civilized nation, but characterized by a degree of absurdity, for which it is scarcely worth taking the trouble of being so preposterously wicked. (Raffles 1835: vol. 1, 87)

Raffles argued that indigenous prosperity was a central component of a stable, profitable, and just colonial society. In the case of the Indies, Raffles emphasized that the British should cultivate the Malay people, and not the Chinese or Arabs, whom he considered the predatory allies of the Dutch.[1] Raffles characterized the Malays as victims of Dutch, Arab, and Chinese oppression and positioned the British as the champions of the Malays. Helping the Malays prosper would solidify the British position politically and pragmatically and improve the environment for trade in the bargain. It was therefore crucial to understand why the indigenous people had not prospered. More than many administrators of his day, Raffles had seriously investigated the culture and histories of the indigenous people of the Malay archipelago, in 1817 publishing his *History of Java*, which explored the varieties of peoples, languages, and daily habits, as well as the geography and history of the islands.

Raffles described the character of various groups of people active in Indies trade in stereotypical terms: lazy or naive Malays, crafty Chinese, parasitic Arabs, and profiteering Americans (Raffles 1835: vol. 1, 81-86). Yet, as far as the Malay people were concerned, he saw the negative qualities not as inherent and unchangeable, but as the cultural consequences of Dutch mismanagement and Arab interference. In Raffles's opinion, the indigenous people had been deprived of the natural advantages of their land and subjected to incoherent systems of local, tyrannical authority, giving them little motivation to try and improve their lot in life. Defining the problem in this way made the answer clear: Introduce free trade and back it up with a uniform and just rule of law. Raffles encouraged trade by collecting tax payments in cash, rather than kind. He reduced the powers of the regents, the indigenous elites who had held authority under the French, and instead worked through elected village headmen (Furnivall 1944: 72-73). Raffles's policies suggest that he believed the indigenous people would respond

the way that people anywhere responded to the opportunities inherent in legally protected free trade, by working for their own benefit, and in the process transforming the East Indies into a profitable, peaceful, and therefore viable, colony.

After the fall of Napoleon, and the Convention of London in 1814, the British returned the East Indies to the Dutch. While the Dutch had disbanded the VOC of their own accord, and in many respects embraced the tenets of Liberalism at home, the new administrators in the colonies did not all share Raffles's optimistic belief in the universally applicable benefits of free trade (Furnivall 1944: 85-89). Their skepticism was no doubt helped along by the indifferent results of Raffles's policies, and the perception that the state's profits under Raffles had been uncertain. Nevertheless, when G. A. G. P. van der Capellen took over the Governor-Generalship in 1919, the Dutch had decided to cautiously move forward with an economy based on free trade. Despite Raffles's claims about earlier Dutch disregard for the Malay peoples, the new Dutch administration embraced Raffles' style of ally-building with the indigenous people, considering the well-being of the indigenous Malays as crucial for the colony's success. Like Raffles, the new government also put their faith (if somewhat reluctantly) in free trade. Yet in formulating economic and legal policies that would lead to widespread prosperity, the Dutch gave more weight to the effects on prosperity of the intrinsic "characters" of the indigenous people and European capitalists than Raffles had ever done.

Van der Capellen, like many Governors-General who succeeded him, gave the most attention to the peoples of Java when addressing concerns about the social welfare of the indigenous people. Java, the most populous island in the archipelago, was also the center of Dutch political control. It was here more than anywhere else that the Dutch worked out the methods of colonial political organization that would eventually spread across the archipelago. And it was here as well that Europeans and indigenous societies had historically developed through intensive contact with one another (Taylor 1983). Dutch attitudes towards the indigenous people of the Indies were profoundly influenced by their perceptions of the Javanese character.

Drawing on assumptions about the nature of Javanese and European cultures, Van der Capellen acted on the assumption that European capitalists were more likely to impoverish indigenous society than to enrich it. Wealthy foreigners would inevitably take advantage of indebted, indigenous landowners, eventually producing a landless underclass. The newly landless could easily become roaming criminals, jeopardizing trade and the colony's success (Furnivall 1944: 91-94). Van der Capellen's policies, it must be said, stemmed as much or more from the ways that traders, particularly British traders, seemed to be impoverishing the state, especially when their abuses deprived indigenous people of their land, the main source of tax revenue. He used state power to regulate Europeans, as much to protect the state treasury as to protect the indigenous people. Nevertheless, Van der Capellen, like Raffles before him and Dutch administrators to follow, based his actions on the assumption that indigenous prosperity of some kind remained crucial to the colony's viability.

Advocates for unregulated free trade argued that the Javanese carried the sole blame for their own troubles. Protecting the Javanese, in this view, did nothing more than cater to cultural flaws. L. P. J. du Bus de Gisignies, a commissioner appointed by King William in 1826, was an outspoken supporter of this position. A former member of the Dutch lower house (the *Tweede Kamer*), and former Governor of South Brabant and Antwerp, he had come to the Indies at King William's request, in order to look into its financial problems. Du Bus defended the inevitable expansion of European plantations at the expense of Javanese peasants by claiming that the Javanese were too weak and lazy to compete. Further, he argued that the only way for them to become stronger was through the (sometimes painful) example of robust and energetic European businesses. The unrestrained practice of free trade, he claimed, would shock the Javanese out of their cultural lassitude and eventually encourage them to be more productive in ways that mattered to the colonial state (Furnivall 1944: 100-103; De Prins 2002). The short-term harm to some indigenous people was, in his view, easily outweighed by the inevitable improvements new attitudes would bring to peasant life.

This early debate about the best policies to pursue for Javanese prosperity already clearly showed the contours of a dispute that would persist for many years. Each side prominently highlighted the identity of Europeans and Javanese (and by extension, the other peoples of the Indies) in their arguments, defining cultural and economic differences between foreigners and indigenous people and devising policies based on assumptions about the implications of those differences. Du Bus argued that it was the Javanese only who were flawed; the best solution was simply for the indigenous people to change, preferably by adopting the attitudes and practices of Europeans. Van der Capellen, who saw the European capitalists as equally implicated in the colony's problems, sought instead to regulate European behavior to insulate the indigenous people (and their taxes) from the worst of capitalist culture. The shifting balance between policies of protection and those of transformation would continue to define colonial social welfare policies until the end of Dutch rule in the Indies.

"Native Society Dressed up in Native Clothes": Indigenous Prosperity under the Cultivation System

Johannes van den Bosch, upon his appointment to the position of Governor-General in 1828, came to the Indies with an entirely new way of thinking about production and prosperity in the Indies. Van den Bosch's long exposure to the Indies while in military service shaped his ideas about the colony's politics and economics. His critique of the situation in the colony spared neither European capitalists nor the Javanese people. He excoriated Europeans for their indolent and ineffectual business practices. As for the Javanese, he attributed to them the stereotypical qualities of laziness and ignorance. Both undermined the promises of Liberal policies:

> [T]o apply to an ignorant and idle people the Liberal institutions of an enlightened age is as impossible as to introduce religious toleration among blind fanatics. First one must try to enlighten their understanding, and then to improve their institutions. (quoted in Furnivall 1944: 109-110)

Van den Bosch's plans, however, never aimed to "enlighten the understanding" of either the Javanese or the Europeans. Instead, under the Cultivation System, he took key export production away from private merchants and put it into the hands of the colonial government. The resulting system turned Java, as scholars have frequently pointed out, into a large, state-operated plantation (Fasseur 1978; Boomgaard 1989). Under the Cultivation System, Van den Bosch reversed Raffles's reforms and collected revenues in kind – specifically in the forms of sugar, coffee, and indigo. In theory, peasant producers were obligated to allocate two-fifths of their land to these export crops, using the remainder to grow food, although actual practice varied from place to place. The colonial government sold their revenue crops at auction, returning the profits to the Netherlands' treasury, making the Indies what Jean Chrétien Baud, Van den Bosch's successor, famously called, "the cork on which the Netherlands floats" (Baud 1842). The system worked by relying on traditional, rural social relations between village headmen and peasant farmers, where headmen enforced both the production and collection of export crops.

While this system of export production brought enormous profits for the Dutch, Van den Bosch also defended his plan by appealing to the ways it would improve indigenous people's welfare (Fasseur 1978). In his view, the problems of the indigenous people had less to do with prosperity than with the crime and social disorder rampant in the colony. Prince Diponegoro's Java War, which had troubled colonial authorities since 1825, probably influenced the priorities of the ex-military man Van den Bosch. He blamed the war on what he perceived as a lack of deeply grounded authority on Java, itself caused by Raffles's disruption of rural hierarchies. Dutch leaders had undermined their own authority with their policies and attitudes and therefore could not rule as successfully as they would like:

> The payment of taxes, the obligation of compulsory labour, the surly conduct of many inferior public officials towards the native, are so many reasons which continually oppose a warm, mutual, union between us and the people. [. . .] [O]ne shall easily recognize, that it is for us impossible to be in tune with the national spirit or to persuade the people that through our presence their interests will be advanced. (Van den Bosch 1980: 54)[2]

Van den Bosch's Cultivation System established "traditional" hierarchies in the countryside, a move that he believed would produce a more stable, and therefore quieter, colony. He restored the rights and privileges of the indigenous regents whose power Raffles had seriously undermined, although Van den Bosch made them intermediaries with the Dutch colonial authorities,

Sketches of indigenous agricultural tools from a travelers' notebook c.1848. Source: Collection of the KITLV, Leiden, The Netherlands, 36D-178

rather than independent leaders in their own right. Van den Bosch called this work "restoration," seeming to create separate spheres for Europeans and the masses of indigenous people, at least in a political sense. The stability Van den Bosch assumed would follow from his policies would bring a measure of prosperity simply by quieting disruption and unrest. Without such distractions, people could return to their ordinary business of farming.

This colonial construction of "traditional native authority" is, of course, better understood as a hybrid of Javanese and Dutch ways. Javanese community life had changed over the years through contact with the VOC, the French, the British, and the new-style Dutch authorities of the nineteenth century. Looking back at the history of the Indies, J. S. Furnivall observed:

> Although Van den Bosch dressed up native society in native clothes, it was a fancy dress, a masquerade of native institutions. [. . .] [I]t was not from the consent of the people but from the authority of Government that they [village headmen and regents] derived their power. (Furnivall 1944: 140)

Furnivall, like Raffles, probably overestimated the extent to which earlier Javanese kingship had ever operated "from the consent of the people" (Nagtegaal 1996: 36-50). But Furnivall's primary point, that the practice of power had a particularly colonial, rather than traditional character, stands. Indigenous leaders needed Dutch backing, and in fact had far more stable authority with it than they had ever had before. Adding a layer of indigenous leadership between Europeans and the ordinary people of the Indies may have made the countryside appear more "purely indigenous," but this was an illusion.

Van den Bosch's policies diverged in significant ways from those that came before him, but like his predecessors, he appealed to his perceptions of cultural identity in defense of his reforms. Imagining that he was restoring "native tradition" reinforced the idea that the indigenous people were, and needed to stay, profoundly different in their assumptions and behavior than Europeans. The colony would be made up of two separate worlds. Van den Bosch's idea of separable indigenous and European societies in no way reflected the dynamic process of cultural mixing between indigenous people and foreigners, often through intermarriage, that was common in the Indies (Cooper and Stoler 1997; Knight 2000). Yet his ideas about the need for separation did have real consequences. He rejected the idea that it was good for the indigenous people to become more like Europeans, instead insisting that they remain tied to their own traditions (even if Van den Bosch had to define them himself), and not be subject to European values. Practices anathema to the most dogmatic Liberal reformers, like communal land ownership and corveé labor, had not been traditional everywhere, but became more widespread in response to the requirements of the Cultivation System. To "dress up natives in native clothes" Van den Bosch rhetorically bound the good of the indigenous people to their distance from European society and practices and instituted policies that exacerbated perceptions of cultural differences between Europeans and Javanese.

The Return of the Liberals: Reactions to the Cultivation System

The Cultivation System, for all of its fiscal benefits, was no cure-all for the Indies. The critiques that arrived in its wake brought with them a new term for Indies political debates: "*welvaart*" – usually meaning prosperity, but sometimes welfare[3]. In 1860, Edward Douwes Dekker, writing under the pseudonym Multatuli, took on what he saw as the greed and oppression engendered by the Cultivation System in his book *Max Havelaar*. Douwes Dekker certainly had real-life

examples to draw on when creating his masterpiece, including the famines that occurred in Cheribon in 1843, which were widely regarded as having been caused by unscrupulous officials taking too much land out of food production in order to produce more export crops (Fasseur 1978: 52-53). Liberal critics, following their own free-trade agenda, repeatedly targeted the moral and economic vacuity of the Cultivation System. After years of discussion, Liberal reformers in the Dutch government began to succeed in their efforts to dismantle the Cultivation System, replacing it with a system of free (or at least freer) enterprise for Indies export production (Furnivall 1944: 159-167). The transition from the Cultivation System to the private exploitation of Java was gradual, as the government retained control over some crops, like cinchona, but relinquished others, most notably sugar, as established in the Sugar Law of 1878 (Elson 1984: 127-128).

The question of indigenous prosperity played a role in many Liberal debates, especially among those who drew on Douwes Dekker's moral outrage. W. R. van Hoëvell, a Christian minister and activist in the Indies, emphasized the shared benefits of free trade, dismissing the separatist fantasies of Van den Bosch. Not only would Europeans benefit, but Javanese farmers would have powerful new incentives to improve their land--something they had no motivation to do while obligated to hand over their most profitable crops to the government (Van Hoëvell 1978: 173-183). Like Raffles before him, Van Hoëvell and others argued that the right economic stimulus was all that was needed to produce the desired improvement in indigenous welfare (Pierson 1877[4]). By focusing on the need for farmers to improve their land and agricultural practices, free-trade supporters were the first to give technological change any clear role in the pursuit of indigenous prosperity, albeit a secondary one. For these late-twentieth-century Liberals, technological change would follow inevitably from the introduction of a free-trade stimulus.

Despite wide support for free-trade reforms, Liberals didn't entirely carry the day. Conservatives like W. J. van Welderen Rengers and J. Kuyper also cited native welfare when defending their own policies, arguing that disparities of wealth in the colony put indigenous peoples at a serious disadvantage, making it impossible for the peasantry to benefit from free trade. After years of the Cultivation System, farmers lacked even basic familiarity with the workings of a free-trade economy and therefore were particularly susceptible to predatory capitalists (Furnivall 1944: 164-165, 175). Thus the indigenous people required protections. The resulting reforms represented a compromise between the two positions. While private enterprise was again welcome to invest in and produce many of the most profitable export crops, like sugar, the Agrarian Law of 1870 guaranteed that indigenous people in possession of land would maintain their traditional rights to that land. A further ordinance in 1875 made it impossible for Native lands to be alienated to non-Natives. These laws satisfied those who wanted to protect the

indigenous people from capitalist predation, while at the same time guaranteeing that peasants would have the incentive of their own profits to work towards an improved economic position in society (Furnivall 1944: 178-180; Elson 1984: 127-128).

This compromise worked in part because of a point of agreement that had been reached between Conservatives and Liberals. Rejecting the economic and cultural separation implicit in the Cultivation System, policymakers on both sides agreed that indigenous people needed to learn and change in order to achieve prosperity in colonial society. While not all Dutch policymakers believed that Javanese character or culture contained inherent flaws, both sides agreed that the indigenous people would need time to learn how to benefit in a free-trade society. The protections, although accepted reluctantly by some, seemed sensible because they would allow indigenous people the time to transform themselves into independently productive members of society. Most importantly, policymakers began to see "native welfare" as a result that would emerge gradually, as much from the self-conscious efforts of the indigenous people to change their practices as from the top-down policies of government. Without yet using the term, policymakers were starting to see indigenous prosperity not merely as a swift and automatic response to economic stimuli, but as the end product of a process of development.

Development and the Ethical Policies

A striking quality of these ongoing debates about colonial economics and indigenous prosperity is the way that the more cynical politics of ally-making for the ultimate purpose of increased trade or state profits, which is so evident in policymaking from Raffles through Van den Bosch, was increasingly submerged in the language of humanitarianism and social welfare. By the early-twentieth century, this shift of focus, if not of purpose, becomes most clear. Despite the hopes cherished by the reformers of the 1870s, early-twentieth-century social critics doubted the ability of Liberal reforms to produce indigenous prosperity. Indeed, a few of these critics argued that indigenous prosperity had not only failed to improve, it had declined noticeably (*Welvaartcommissie* 1905). What remained unclear, however, was the nature of the problem: Did it stem from European abuses, Javanese responses to Liberal reforms, or from the colonial system itself? One influential colonial critic, C. T. van Deventer, took the latter position, faulting colonial revenue management, in which all state revenues went back to the Netherlands and were then reapportioned parsimoniously to the Indies by the Minister of the Colonies. The colonial government, left with inadequate resources to manage the colony properly, had been forced to raise taxes on the indigenous people (Van Deventer 1899: 205-257). Van Deventer argued that decentralized authority would make the colony more fiscally stable, and conse-

quently would reduce burdens on the indigenous people. His case for autonomy became more compelling because he linked it (sincerely, it seems) to the cherished ideal that colonial rule was good for the people of the Indies.

Critics from the Socialist party (both in the Indies and in the Netherlands) reversed Van Deventer's priorities, making the question of indigenous welfare the centerpiece of their attacks on the Liberal reforms in particular and the colonial system in general. Henri Hubert van Kol, a prominent socialist member of the Dutch parliament, argued in the *Tweede Kamer* (the Lower House) that the colonial government should care first for the indigenous people, and only secondly worry about colonial profits (Van Kol 1911). Van Kol consistently championed the cause of indigenous welfare in an effort to rein in the worst excesses of capital in the colony (Van Kol 1901: 197-220). Pieter Brooshooft, whose pamphlet, "The Ethical Course in Colonial Policy" became the source of the "Ethical" moniker that policymakers, the popular press, and later historians, would give to reform efforts and reformers, agreed. A public figure whose journalism career included the editorship of *De Locomotief*, a major newspaper based in Surabaya, Brooshooft argued that colonial authorities had moral obligations that preceded the requirements of economic gain:

> What should motivate us to carry out our obligations in the Indies is the best of human inclinations: the feeling for justice, the feeling that we should give the best we have got to the Javanese, who have been subjugated by us against their will, the noble-minded impulse of the stronger one to treat the weaker one justly. (Brooshooft 1977: 66)

Drawing superficially on Marx, Brooshooft argued that governments, both indigenous and Dutch, had made it impossible for peasants to profit from their own work. He recommended a return to state production, only this time with the good of the indigenous people, rather than the profits for the Dutch, as the criterion for its operation. Barring such reforms, Brooshooft feared, the outlook for the masses of the Indies was no different than that of the labouring masses elsewhere in the world:

> My conclusion is that our policy with respect to Native agriculture pushes the villagers slowly but surely into the same swamp of moral and physical misery into which the disinherited masses of Western society have sunk. (Brooshooft 1977: 71)

Yet Brooshooft did not blame only the colonial government for the sad state of affairs. He also found fault with Javanese culture, which he believed made the Javanese people especially susceptible to abuse. He cited a "primitive and childlike love of pleasure" that made them soft and impractical, unwilling or unable to protect themselves either politically or economically (Brooshooft 1977: 69). While he portrayed European sugar factories as responsible for the

"psychological destruction of simple villagers," he simultaneously implied that the Javanese were inherently gullible, a way of thinking not entirely divorced from that of Van den Bosch (Brooshooft 1977: 70-72). Brooshooft's call for a reconstruction of the Cultivation System is therefore not surprising, although he imagined the profits returned to the indigenous people themselves rather than remitted to the Netherlands. If the indigenous people could receive the profits that the government was able to generate from export production, wouldn't they be much better off?

Brooshooft's idea generated little enthusiasm in a colony generally committed to expanding European investment and free enterprise. Yet reformers of all stripes agreed that the economic problems of indigenous society stemmed at least in part from certain characteristics of Javanese culture. The indigenous people simply didn't respond to Liberal economic stimuli in expected ways, leading to economic hardships. The Ethical reformers who emerged in the early-twentieth century envisioned improved indigenous prosperity coming from a process of education, therefore, a process in which those aspects of Javanese culture that prevented the indigenous people from flourishing could be corrected, and the people themselves transformed. Such a transformation would benefit the Javanese of course, but also those Dutch manufacturers who hoped to build markets for Dutch consumer goods in the Indies as the British had so successfully accomplished in India (Furnivall 1944: 233). By the early-twentieth century, reformers started to call this kind of transformation of the indigenous people *ontwikkeling*, or development. They traded the economic and fiscal policymaking of the past for more interventionist policies that emphasized the Dutch role as tutors to the indigenous people, with success requiring the active participation of players in both parts of colonial society.

The Technological Turn in Development

Queen Wilhelmina endorsed Ethical welfare planning when in 1901, she called the declining welfare of the colonized peoples her "particular concern" and ordered an investigation into its causes (quoted in Creutzberg: vol. 1, 173). At the beginning of the twentieth century, the most "Ethical" of the Ministers of the Colony, A. W. F. Idenburg, and D. Fock, promoted change by creating programs for the Javanese to improve themselves and progress towards self-rewarding participation in colonial society. The reforms most frequently studied by historians were in the social and political arenas, including efforts to increase and encourage Western-style education, loosen restrictions on the press and political organizations, and even encourage benign political activism and awareness among indigenous youth (Locher-Scholten 1981; Ricklefs 2001). But the Ethical policies also targeted economic improvement, and many people of the time considered these economic and technological policies as important as, or even more important than the other reforms. One J. E. Stokvis made this point in 1918, when he asked what good

it would do to bring about the spiritual and intellectual development of the indigenous people if they remained economically backward.[5] Although they have received less attention than the social and political reforms, the economic and technological measures in the Ethical policies also became important sites for political conflict and negotiation. The nature of the reforms themselves, because they frequently addressed the rural peasantry, are of considerable interest for understanding the effects of Ethical thinking far from the centers of colonial rule.

As is clear by now, concern for economic prosperity was nothing new for Indies policymakers in 1900. But interventionist technology projects played a far larger role in the early-twentieth century than had ever previously been the case. Europeans imagined they would teach the indigenous people how to prosper. The Ethical slogan, "irrigation, education, and emigration" highlights the ways the government thought technology could bring about improvement. Irrigation projects would increase peasant rice yields, thereby improving indigenous and state incomes (Van Doorn 1982; Ravestijn 1997). Agricultural and to a much lesser extent, vocational schools would train youth to value new techniques and technologies. Emigration projects, which would send Javanese to less-crowded islands in the archipelago, aimed to spread not only the Javanese, but also the practices of wet rice agriculture to the rest of the archipelago, with the government providing tools, education, and irrigation works to make this possible (Idenburg 1904). Policymakers like Idenburg and Fock did not define development as purely technological, but in their planning, technology became a significant component of the larger Ethical program.

In some respects, the emphasis on technology is surprising. The *Binnenlands Bestuur*, the European civil service in the Indies, had undertaken a few technological improvement projects in the nineteenth century as side projects to their ordinary work, whose results ranged from indifferent to disastrous (Van den Doel 1994; Fasseur 1994). Most projects, like the introduction of row planting, for example, were regional and driven more by the enthusiasms of individual bureaucrats, than by strong directives from the central government. Belief in the possibility of development through technological change in agriculture came more from Dutch examples than from any experiences on Java ("*Kamerdebatten*" 1904: 60). Interestingly, the idea that indigenous agricultural technology and European agricultural technology were at very different levels was one that would have been hard to sustain only thirty years earlier. It wasn't until the mid- to late-nineteenth century that the widespread use of fertilizers had produced dramatic yield increases in Dutch agriculture, and indeed it is likely that Balinese rice agriculture had long provided much higher yields per hectare than was typical in Netherlands grain production before this time (Lansing 1997). In the colony itself, sugar producers had only started introducing advanced milling technology and irrigation practices in the late-nineteenth century. Before that time there had been little difference between their methods of production and those practiced by Chinese or indigenous producers elsewhere in Southeast Asia (Leidelmeijer 1997: 113-147). Yet as technological change began to produce substantial economic gains for

many Europeans (the sugar industry's being the most telling example on Java), it came to be seen as a central achievement of Western culture and a necessary part of any process of colonial modernization (Adas 1989). Colonial reformers increasingly conflated tradition with stagnation and technological innovation with economic growth. Improving indigenous economies meant improving indigenous technology.[6]

Unlike earlier critics who cited laziness and naiveté as the greatest cultural flaws of the Javanese, advocates for technological development identified a lack of innovative ability as the problem that held the Javanese back. Melchior Treub, the Indies' most famous scientist and head of the world-famous Botanical Gardens at Buitenzorg, argued that the technical assistance his proposed Department of Agriculture could offer would benefit the Javanese by teaching them the value of innovation. Like some earlier critics, Treub saw this flaw emerging not from any inherent racial shortcomings, but from the circumstances of life in the Indies. Drawing on a popular ecological fantasy of life in the tropics, he argued that the Javanese had never needed to innovate because attaining a comfortable subsistence had always been easy, a mere matter of harvesting the abundance surrounding them (Treub 1902). The future, however, posed serious challenges. Rapid population growth would make it increasingly difficult for the indigenous people to feed themselves using their traditional methods. The Javanese needed new technologies for the immediate future, as well as the skills to innovate for the longer-term, in order to ensure their own survival. Others who pointed to a lack of innovative drive as the main factor in Javanese backwardness included Governor-General W. Rooseboom and Dirk Fock (Idenburg 1904). In a speech to the *Tweede Kamer*, Fock argued that the character of the indigenous people made it necessary to use European innovations to jump-start the process of development:

> Not easily will the Native of his own accord change to a new planting method for instance; not easily will Native people introduce on their own improvements in agriculture; from the initiative of the people in this field, little is to be expected. ("*Kamerdebatten*" 1904: 266)

The technological approach, and the assumptions of correctable indigenous backwardness that underpinned it, proved remarkably popular among policymakers in the Indies, just as similar ideas were taking off elsewhere in the world (Marx 1987: 33-41; Smith 1994: 1-35). When the *Tweede Kamer* debated the creation of a Department of Agriculture in 1904, members agreed that scientific and technological guidance was essential for indigenous welfare, even if they didn't agree on exactly how to go about providing it ("*Kamerdebatten*" 1904). But there were some nay-sayers. Brooshooft, for example, called for a head-tax reduction as the surest way to improve indigenous welfare (Brooshooft 1977: 66-71). Van Deventer, although of a different political persuasion than Brooshooft, also argued that the head-tax was the main reason that the indigenous people had not prospered after the 1870s. Fiscal approaches were arguably much simpler and required none of the considerable initial investment that technology projects did

(Idenburg 1904). What therefore accounts for the popularity of technological policies? One simple reason was that, despite the initial investment, technological policies promised to put money back into the government's coffers, because tax revenues were based on crop yields. Tax reductions, in contrast, would simply remove money from the budget ("*Kamerdebatten*" 1904: 279-280).

An arguably more compelling reason for officials to support technological change as the route to indigenous prosperity, however, was that it would simultaneously address a pressing concern of the colony: the increasing inability of the local food supply to keep up with population growth (Idenburg 1904; Treub 1902).[7] By 1900, both anecdotal evidence and the census indicated that Java's population was growing rapidly, and the formerly self-sufficient island had been forced to import food to meet shortfalls since the 1880s. While later scholars partially debunked the figures contained in this census, colonial officials at the time did not doubt the results, and it was clear that on Java at least, population pressure was becoming a problem (Boomgaard 1989; Peper 1980: 131-154). Observers most frequently cited the increasing difficulty young Javanese would-be farmers experienced in obtaining sufficient uncultivated land to work (Treub 1902).[8] Many started to push into increasingly marginal lands (in terms of productivity) to make a living (Boomgaard 1990). Yet Javanese food agriculture did not typically yield a large surplus beyond the needs of the farmers themselves. Ultimately, food for more and more landless people would have to come from expensive imports.

The concern with food problems, and the new enthusiasm for science and technology to define and address them, is clearly seen in the colonial government's novel response to a famine in Semarang that took place in 1902. A famine and an accompanying water shortage had produced great hardship in an area that had experienced periodic famines over the years. Although officials were aware that drought and crop failure had triggered the famine, they nevertheless ordered a scientific investigation in order to get a fuller analysis of the situation (*Netherlands East Indies Waters – en Voedingsnood-Commissie* 1903). This comprehensive, scientific study represented a significant departure in the official approach to food problems in the region. Nineteenth-century officials had tended to see crop failures as inherently short-term, and largely unpredictable. They therefore limited their interventions to food-aid programs (Hugenholtz 1986). The Semarang report, in contrast, argued that the famines in the region were not cases of incidental and unpredictable crop failure, but symptoms of a pervasive, systemic problem rooted in the combination of crop choice, irrigation methods, and patterns of land ownership. The report concluded that the area had suffered not simply because of bad weather or virulent plant diseases, but because of the local practice of indigenous agriculture. Famines could be avoided in the future if farmers adopted more suitable practices for the land.

Scientific methods did not so much "unveil" the problems associated with the food supply and population growth, which most officials already agreed existed, as serve as a new way to validate and document official anxiety. They provided a framework for observing and describ-

ing these problems in ways that went beyond mere anecdotes and which were amenable to quantification. The census, which gave an overarching, simplified view of the population of the Indies, offered numbers that could be combined with harvest estimates to statistically validate the insufficiency of the food supply. Science provided a tractable way to frame and precisely define the nature of the problems at hand (Anderson 1991; Scott 1998).

Given this framing of the colony's problems, technological solutions offered obvious benefits. By reshaping indigenous agriculture, the food supply might eventually be able to keep pace with population growth, and indigenous prosperity would improve at the same time. Minister Idenburg, for example, argued for the technologically supported emigration of landless Javanese to new agricultural settlements in the so-called Outer Possessions, the islands outside of Java, especially Sumatra, Sulawesi, and Borneo. He suggested that the government provide new trains and tramways, telegraph lines, irrigation works, and agricultural credit for the settlers, thereby creating modern settlements that would produce much-needed rice, and in which a high standard of living would be possible. Governor-General Rooseboom disagreed with Idenburg, suggesting that government spend the same money improving existing Javanese farms instead (Idenburg 1904). Despite their disagreements on how to best use technology, both Rooseboom and Idenburg nevertheless defined development as a technology project that could both support the Ethical goal of improved welfare among indigenous people and solve the critical colonial problem of an inadequate food supply. Alternative ways of improving the lot of the indigenous people, like tax reductions, would reliably produce neither additional tax revenues nor extra food. The double promise of technological development policies--welfare and food--was an unbeatable combination.

Conclusion: Development as a Technology Project

It is tempting to look at the technological turn in development and see it as a marker of an emerging technocracy in which negotiation over the question of indigenous prosperity had been removed from the political arena. Nothing could be further from the truth. Making development a technology project would certainly give technical experts a prominent role in defining the direction of development in the colony, as the following chapters will show. But it is important to realize that simply adopting a technological approach in no way resolved the fundamental political debate that had troubled colonial policymaking on indigenous welfare for nearly a century. Embracing technological change as a means did not clarify what the ends of development should be. What should or could the indigenous people transform into? What role would they play in colonial economic life? What would their relationship be to European society? Although breaking with the past by identifying the lack of technological initiative as the key shortcoming of Javanese society, advocates of the Ethical policies like Idenburg and

Rooseboom nevertheless sidestepped the larger questions that had long informed policymaking aimed at increasing indigenous prosperity. Would it create an indigenous population that simply became exactly like Europeans in their economic habits and ambitions, or should colonial authorities aim for something else entirely? Leaving development in the hands of technical experts, while seeming to open up a wealth of new methods and opportunities, did nothing to answer that question. As we shall see in the coming chapters, technical experts did not all share the same values, nor did they always advocate the same answers to the problems of indigenous welfare. Making development technological did not provide easy answers. Instead, it added technical experts (and in some respects technologies themselves) as new participants in this old and vexing political negotiation.

2

Creating a Department of Agriculture: Science, Technology, and Ethical Ideals

In 1904, when A. W. F. Idenburg, the Minister of the Colonies, said, "Welfare, progress, and development – and directly or indirectly the security of adequate State income – depends ultimately on that which can be gotten from agriculture," he made clear that agriculture, the primary source of income for the majority of the population, as well as a key source of tax income for the state, would be the central focus of the project of development ("*Kamerdebatten*" 1904: 161). From the earliest days of the Ethical movement, therefore, "native development" became nearly synonymous with agricultural improvement. Citing past involvement in agriculture, both the Indies Civil Service (the *Binnenlands Bestuur*) and the Department of Public Works put themselves forward as the bureaucratic agents that could best make the promise of "irrigation, education, and emigration" a reality. They were challenged by Melchior Treub, the highly respected head of the Indies Botanical Garden, who proposed instead that a new Department of Agriculture be the home for scientific and technical work aimed at improving indigenous agriculture. The battle over who would take charge of development centered on the kinds of experts who could best produce development, the nature of the relationship that development programs should create between the government and the indigenous people, and ultimately, the definition of what kind of outcomes development should produce.

Only One Means? The Promise and Problems of Irrigation

Because of the prominence of irrigation in Ethical sloganeering, it might seem that the Department of Public Works would become centrally important to colonial efforts to develop the indigenous people. The simplistic assumption that more water equated with higher yields appears often in early debates about Ethical reform. In a 1904 exchange with Idenburg on the direction of development projects, Governor-General Rooseboom argued that improving irrigation on existing Javanese farms was the best way to increase yields and improve the lives of indigenous farmers. Rooseboom's enthusiasm is unsurprising, as rice, a staple of the Javanese diet, responds vigorously to increased (and better-controlled) levels of water. He cited the irrigation expert I. D. Fransen van de Putte who said: "Not only for the income but to meet

the economic needs of the people, there is, according to all experts and all journal articles only one means: improvement of irrigation" (Idenburg 1904: 190). Irrigation projects also had an advantage, from the European community's point of view, of making more land suitable for the highly profitable sugar industry. Any technology that could satisfy both idealistic believers in indigenous prosperity and well-heeled investors eager for private gain would seem to be a natural choice for development projects.

Yet even in the early days of the Ethical policies, large-scale irrigation works did not enjoy uncritical acceptance in development planning. While irrigation projects remained a fact of colonial life, the argument that they would produce development for the indigenous people rarely went unchallenged. Although irrigation remained an important technology in the colony for other reasons, colonial officials did not unquestioningly embrace large irrigation works as a useful technology for the indigenous people's development.

For advocates of irrigation, the timing of Ethical reforms could not have been worse. The early years of the twentieth century saw the conclusion of one of the biggest debacles in the history of irrigation in the Indies, the Solo Valley works.[1] Conceived originally to decrease flooding in the Solo Valley and improve shipping in the area, the project expanded considerably in the 1880s, with several dams, canals, and other irrigation works. The 18 million-guilder budget was to produce works across the valley that would eliminate flooding and (according to the plan) irrigate 223,000 bouws of land, where a bouw is about 7000 square meters. Since many farmers depended on rain for their rice paddies, this plan would seem to have been as good for them as for the planters who hoped to introduce sugar cultivation to the fertile valley. Yet the project suffered from poor planning and implementation, resulting not only in significant cost overruns, but also in an ever-receding time to completion. In 1898, the Minister of the Colonies temporarily halted the project, calling for an inquiry into its considerable troubles. The appointed investigative commission reported their opinion that the project could be successfully finished, albeit at nearly three times the budget and after an additional fifteen years of work. The sugar industry even volunteered funds. Despite this advocacy, in 1903 A. W. F. Idenburg, recently appointed Minister of the Colonies, put a final stop to the project (Ravestijn 1997: 173-206).

Financial problems and clear evidence of incompetence in planning and implementation played an important role in Idenburg's decision to terminate the project, but he and other detractors also cast doubt on the claims that it would provide benefits for the indigenous people. Idenburg himself noted that it would be very difficult to ensure that such large irrigation works would distribute water, with its all-important silt, in a way that would benefit most ordinary farmers. H. H. van Kol feared the catastrophe that would result if a large dam failed, which had certainly happened to smaller dams in the nineteenth century. A former director of the Department of Public Works disliked the cost of the project and argued that for the money, there was little evidence that it would truly increase yields. Irrigation was, after all, only one

factor in rice harvests. Indeed, the Public Works department had seen some of their projects actually decrease yields because they had changed the chemical or silt composition of the water, damaging harvests. Ultimately, Public Works built a series of smaller reservoirs, rejecting the plans of the 1880s (Ravesteijn 1997: 193).

One must be careful not to simplistically assign the advocates and detractors of the Solo Valley works Ethical and non-Ethical roles. While Idenburg, an important advocate of Ethical thinking, rejected the project, C. T. van Deventer, another prominent Ethical thinker, strongly supported the Solo Valley works, arguing that the indigenous people should not be left with nothing but "god's water on god's acre" (Ravesteijn 1997: 200). These divided opinions show the ways that Ethical thinkers struggled with the question of technology and its relationship to positive social change and development. Particularly in light of a limited colonial budget, dedicating funds to large-scale dams would preclude other projects, without offering anything more than a vague promise of benefit for the indigenous people. While the large works constructed by the colonial government could indeed make more water available to large areas, it was difficult to predict whether water would get to those who needed it most. Most tertiary irrigation works, those that brought water into villages and farms, had to be built by the local people, as the Department of Public Works could not take on the large numbers of local projects required in an area the size of the Solo Valley. Depending on the nature of the change in the local water supply, farmers could as easily be flooded out of their land, or receive none at all, as benefit.

A late-nineteenth-century irrigation project in the Tjihea plain in West Java illustrates the unpredictable outcomes of large irrigation works under the conditions of early-twentieth-century colonial Java. Before Dutch intervention, the area had no reliable irrigation works, and therefore little wet-rice land. While water was easily brought into the valley after new irrigation works were constructed, drainage was inadequate, due to both a lack of technology and the nature of the soils, which did not absorb water readily. Local farmers had little choice but to leave water stagnating in the fields, with appalling results. Rice yields did indeed increase, but more and more villagers began to suffer from malaria, as mosquitoes bred in the standing water. The increasing rates of malarial infection made it even more difficult to find healthy people to build improved drainage works or work the rice fields, creating a vicious cycle (Dijkstra 1912). It was not until the late 1910s that the colonial government began to make a serious effort to repair the damage produced by the supposedly beneficial irrigation water (Sibinga Mulder 1920). The people most well positioned to take advantage of large irrigation works were, unsurprisingly, European planters, who could lease the best lands available after the works were in place and build their own tertiary works to distribute water optimally over the cultivated area.

Problems like those at the Solo Valley and in Tjihea did not lead the colonial government to refuse to build irrigation works. Far from it. The Department of Public Works would continue to build irrigation works, even very large ones, throughout their years in the Indies. Nevertheless, it would always be difficult for them to claim that such projects produced increased pros-

perity among the indigenous people without a chorus of criticism from skeptics. The history of the Solo Valley works provides the first suggestion of the concerns that development advocates in the Indies, especially those in the Ethical camp, would have with large-scale, centralized technologies that promised to help a great number of people over a large area. The inability to predict whether such expensive technologies would help or hurt any given farmer, and the (budgetarily necessary) neglect of local tertiary works, made claims to the "developing" qualities of large-scale dams unconvincing to many. Large-scale irrigation may have been an important technology for the Indies, but experts and most officials would consider it at best a blunt and unpredictable instrument for producing prosperity. Despite the glib Ethical calls for "irrigation, education, and emigration," the Department of Public Works, and large-scale irrigation, would never be central to the project of "native development" in the Indies.

Creating a Department of Agriculture

For most Ethical reformers, improving indigenous agriculture, with or without the help of large-scale irrigation, offered the most promising avenue for development. By 1904, both Idenburg and Rooseboom backed a new bureaucratic entity, the Department of Agriculture, to become the central authority for agriculture in the Indies, and therefore, the primary organization to manage the development of the indigenous people (Rooseboom 1902; "*Kamerdebatten*" 1904). The prominent role of science and scientists in this new Department, and the significance of development to the Department's responsibilities, represented a significant break with past colonial administrations. Melchior Treub, the most prominent scientist in the colony, became the Department's most influential champion. He argued for a Department that would be a "completely competent advisor for the government" driven by a scientific organization devoted to "rational" improvements of crop production (Treub 1902: 10).

Treub's belief in the value and necessity of scientific research for development set him apart from those who saw a multiplication of irrigation works as the most direct route to higher yields and prosperity. He had spent a long and distinguished career practicing and institutionalizing science in the Indies (Goss 2004). Trained as a botanist, in 1880 he was appointed to the directorship of the Botanical Garden in Buitenzorg, a subdivision of the Department of Education, Religion, and Industry (Zeijlstra 1959). At Buitenzorg he combined a commitment to science with formidable organizational skills to create a world-class facility for the biological sciences. He built laboratories, organized a fund to bring scientists to Java from around the world, and originated and published the periodic scientific review *Annales du Jardin Botanique de Buitenzorg*. By 1900, the formerly sleepy and uninteresting Botanical Gardens at Buitenzorg had gained a worldwide reputation as a place where biological scientists could conduct innovative research.

Treub (front left) in the Botanical Laboratory at the Royal Botanical Garden in Buitenzorg, c. 1900.
Source: Collection of the KITLV, Leiden, The Netherlands, 33398

Despite his success in the scientific community, Treub's work at Buitenzorg was vulnerable to colonial budget cutting because officials saw the research as interesting only to scientists and not of practical use for the colony (Goss 2004). Treub battled this perception by encouraging scientists to investigate issues of particular interest to planters, especially sugar planters. Working in Treub's laboratories at the Botanical Garden, Indies' scientists contributed significantly to understanding the sugar cane disease *sereh*, which had brought Java's sugar industry to a standstill in the 1880s (Benecke 1892). Treub's new Department of Agriculture would subsume the Botanical Gardens and, with the development of the indigenous people as a primary

mission, satisfy utilitarian-minded decision makers. He successfully argued that non-scientific bureaucrats could not direct scientific work, making this scientifically organized Department a peer of other major bureaucratic departments in the government, rather than a subdivision (Treub 1902: 3-7).

Treub argued for science as the only solution for contemporary agricultural problems by framing those problems as entirely new. Just as export producers had used science to help them deal with stiff international competition after years of working in relatively uncompetitive markets, so, he claimed, would science help indigenous producers faced with the newly declining availability of land and increasing population. Arguing that indigenous people had never needed to work hard or innovate to take advantage of the easily gained, natural bounty of the tropics, Treub dismissed traditional practices as inadequate for the new problems of land scarcity and food shortage. Trial and error, conservatism, and ignorance had become luxuries. Science, he claimed, could determine the best possible land use and increase the yields of all-important food crops to their maximum potential. The colony's survival, in Treub's view, rested on scientific rationality.

While Treub's support for a scientifically directed Department as a central authority for development reflected broader international trends, he also drew on his and others' dissatisfaction with amateurish improvement projects run by the *Binnenlands Bestuur* in the nineteenth century.[2] The *Binnenlands Bestuur*'s bureaucratic logic, while functional for day-to-day administrative tasks, did not permit the establishment of the stable networks of people and technologies that would allow new agricultural methods, tools, or materials to thrive and spread (Callon 1986; Latour 1987). As with most government bureaucracies, the *Binnenlands Bestuur* frequently transferred their employees from place to place over the course of their careers. Bureaucrats rarely stayed in one residency long enough to fully implement or test a particular improvement, making it difficult or impossible to establish any kind of long-term relationship with the people of the region. As personnel moved, they usually had no guarantee that someone else would take over their pet projects. On a broader scale, there was no apparatus for personnel to communicate between projects happening in different residencies, or to effectively learn from previous experiences. Each project, even if dictated from the central government, operated locally, but with little promise of continuity in the relationship between the improvers and the farmers. Rather than an incoherent group of independent and desultory interventions, the colony needed ongoing scientific support for and oversight of projects that could continue regardless of changes in the local bureaucracy, and a central agency to coordinate and evaluate rationally organized projects.

Treub also questioned whether the broadly trained members of the *Binnenlands Bestuur* had expertise adequate for engaging the scientific side of development. The civil service had comprehensive responsibility for interacting with the *Inlands Bestuur* (Native Civil Service) that worked in parallel with the *Binnenlands Bestuur* on the day-to-day administrative tasks

of colonial governance. Accordingly, they trained as generalists, with courses in indigenous languages, customs, and law, as well as a grounding in basic mathematics and sciences (Fasseur 1994). They had no training in technical fields and little understanding of agriculture of any sort, apart from what they could observe. Plans dictated from the Governor-General's office sometimes backfired, producing worse rather than better harvests because local conditions or practices did not fit well with the project suggested. Some simple projects, like introducing row planting, for example, might produce good results for one crop, but poor results for another. The *Binnenlands Bestuur* was unable to interpret such outcomes or define a course of action beyond simply dropping the work altogether. Further, indigenous farmers learned to distrust European improvement schemes, sometimes actively resisting them, for instance, by rushing to plant early, before officials could interfere with their work (Van den Doel 1994: 222; *Welvaartcommissie* 1905: vol. 5). Officials responded to resistance either by giving up, or by compelling participation using *perintah alus* or "soft persuasion," which was often not soft at all.

One nineteenth-century agricultural improver, Karel Frederik Holle, had different ideas about agricultural improvement that would profoundly influence Treub and other twentieth-century policymakers (Van den Berge 1998). Holle came to the Indies as a young man in 1844 and worked at tea plantations in West Java. He developed a keen interest in the Sundanese people (an ethnic group in West Java) and their agricultural practices, and he was convinced that the Sundanese could become more productive farmers. He introduced new agricultural practices using a unique (for the Indies) system of demonstration. Working privately (outside the *Binnenlands Bestuur*), Holle dedicated the rest of his life to improving agriculture in the region and advocating his system of demonstration. Holle's ideas spread quickly through European society, garnering much interest, respect, and an occasional official experiment ("*Halfjaarlijksch* Rapport" 1874).[3] Despite notable differences in philosophy to be explored later, supporters of the new Department of Agriculture frequently cited Holle as an inspiration ("*Kamerdebatten*" 1904: 272).

Holle's system of agricultural improvement assumed that Western agricultural knowledge could help indigenous farmers only if there existed a close and trusting relationship between the agricultural advisors and farmers. Holle's demonstration fields would employ local people, be continuously open to visits from local farmers, and become sites for building relationships as much as demonstrating the fruits of Western science. Advisors should learn the local languages, communicate directly with farmers, and dedicate themselves to life-long work in a particular region. Holle's system proposed a close-knit and permanent (or at least very long-term) network of improvers and farmers working on local problems of interest to both. His system could hardly differ more from the contemporaneous practices of the *Binnenlands Bestuur*, although it did draw on Western ideas about agricultural demonstration, and in many ways resembled demonstration practices popular in the Netherlands (Bieleman 1992). In his multilingual pamphlet, *De Vriend van de Javaanschen Landman* (*The Friend of the Javanese Farmer*, published in

Malay, Javanese, Dutch, and Sundanese), Holle compared the European past with the Javanese present, arguing that indigenous farmers were no more superstitious than Europeans had been. They would eventually abandon their superstition-ridden agricultural practices, just as European farmers had done (Holle 1871). The key was to guide farmers to more "rational" practices through demonstrations that were organized by trusted mediators.

In 1874, the Governor-General appointed a commission, which included Holle, to institute improvements in rice agriculture in specific residencies according to the Holle system (*Welvaartcommissie* 1905: vol. 5; "*Halfjaarlijksch* Rapport" 1874). The commission reported good results a year later, but appeared to have been overly optimistic about longer-term possibilities, as the logic of the mobile bureaucracy took its toll. Rarely did the *Binnenlands Bestuur* actually put Holle's idealistic visions into practice, usually substituting *perintah alus* for the trusting relationships Holle advocated. In the end, they failed to produce the permanent network between improvers and farmers that Holle had seen as crucial.

Treub and Holle shared some important beliefs that were reflected in their respective systems of agricultural improvement (Treub 1904: 65). Both believed that Western knowledge would provide a more rational, productive approach to indigenous farming, that agricultural improvers had to be dedicated to agriculture, that *perintah alus* was counterproductive, and that trust between farmers and experts was critical to the enterprise's success. However, while Holle emphasized demonstrations and close relationships with farmers, Treub neglected demonstrations and focused instead on creating scientific knowledge, assuming that scientifically based improvements would meet no resistance from farmers. Treub first ensured the sound scientific grounding of the Department, mainly by carefully vetting prospective employees for scientific competence and ensuring his and the Department's autonomy from non-scientific bureaucrats. Treub's proposed department may have envisioned a stronger, more stable network of agricultural experts than the *Binnenlands Bestuur* could muster, but the relationship between farmers and experts remained ill defined. For Treub, building a solid scientific foundation would eventually eliminate the problem of trust between farmers and improvers. Establishing faith in his Department, both among colonial officials and observers, and among indigenous farmers, would prove far more difficult than Treub anticipated.

Challenging Treub

Some dissenters questioned Treub's focus on science and asked whether agricultural development ought to be driven by scientists or science at all. One of these critics was P. C. Arends, director of the *Binnenlands Bestuur* (Arends 1902). Echoing familiar charges leveled against the Botanical Garden, Arends argued that scientists would privilege scientifically exciting and prestige-enhancing studies over more practical and immediately beneficial work. H. H. van

Kol seconded this opinion in a debate in the *Tweede Kamer* ("*Kamerdebatten*" 1904: 153-154). He pointed out that the Botanical Gardens had paid no voluntary attention to indigenous agriculture while producing many useful results for sugar, tea, and tobacco planters. A forest service official named J. S. van Braam extended this critique in 1903, by arguing that direct, day-to-day experience with the farming people of the Indies was far more important (Van Braam 1903). Van Braam and Arends both claimed that the *Binnenlands Bestuur* suited the project of development far better than scientists who would spend most of their time holed up in the privacy of the experimental fields and laboratories at Buitenzorg. Both agreed that the *Binnenlands Bestuur* had the practical orientation and the trust of the people, something the proposed Department had no provision for creating (Van Braam 1903: 14).

This critique illuminates the important connections that many saw between the project of development and the government's relationship with the indigenous people. Van Braam probably overstated the extent to which the indigenous people trusted officials in the *Binnenlands Bestuur*, yet the officials' daily work, supported by their generalist training, did make a compelling case (at least in European minds) for their superior ability to interact successfully with the indigenous people. Treub,

Politician H.H. van Kol c.1920.
Source: Collection of the KITLV, Leiden, The Netherlands, 2745

however, continued to ignore the question of outreach to the indigenous people, instead insisting that science would be the key to agricultural improvement, and implicitly development, in the colony:

> There is a logical fault in the reasoning of the Director [of the *Binnenlands Bestuur*]. It is to be found in the antithesis between "practical" and "scientific outcomes." This contradiction *doesn't exist*. Trustworthy practical outcomes *can only be gotten through the application of scientific outcomes*. (Treub 1903) (emphasis in the original)

Treub employed an ideology of applied science, in which scientists would create knowledge in one place, the laboratories and fields of Buitenzorg, and later apply it to the outside world. Treub, like many scientists, considered the "applying" largely unproblematic and insisted that getting the science right at the front end was the most critical part of the work (Theunissen 1994; Kline 1995). Yet in his critics' opinion, Treub was missing the point. Few doubted that he could produce science. However, by neglecting to address the relationship between his Department and the indigenous people, his critics did wonder whether he could produce development.

Arends and Van Kol raised other objections, especially the concern that scientists would take an overly reductive view of agricultural problems and that scientific projects would replace much-needed economic reforms (Arends 1903; "*Kamerdebatten*" 1904: 166-167). Van Kol remarked that establishing a scientific department without first taking care of the social and fiscal problems in indigenous agriculture was "nothing other than putting the horse behind the wagon" ("*Kamerdebatten*" 1904: 167) and that therefore"[. . .] the Department will tend to be to the disadvantage rather than to the advantage of the economic development of the Javanese" ("Kamerdebatten" 1904: 173). Van Kol's arguments did not have a receptive audience in the *Tweede Kamer*. Dirk Fock, an influential member who would later become Governor-General of the Indies quoted another agricultural expert, N. P. van den Berg, in an emotional and sentimental plea for a new Department: "What Dr. Treub is now taking on is the continuation of that which Karel Holle continually stood for and for which he fought until his dying breath" (quoted in "*Kamerdebatten*" 1904: 272). Fock missed, or chose to ignore, the quite serious differences between Treub and Holle, particularly with respect to the question of interacting with the indigenous people.

Fock's view triumphed as the *Tweede Kamer* approved the creation of the Department of Agriculture, to be established on January 1, 1905. Treub became its first director. The leadership had set their seal of approval on Treub's vision, at least for the time being, but Treub's critics did not back off. They continued to watch the Department closely. Despite his desire to focus on science, the relationship of his Department to indigenous farmers would become the most contentious issue during his tenure.

Building the Department

Treub, like the head of any new institution or organization, had to both design a functional department and establish its authority in the wider community of the Indies. For Treub, authority would follow directly from the credibility of the scientists and the science they produced. Accordingly, he focused his early efforts on building an organization in which the scientific expertise of the staff and the quality of the scientific facilities met the highest standards. Laboratories from the Botanical Garden provided scientific support in such areas as agricultural chemistry, bacteriology, and soils, while experiment fields allowed the scientific testing of crops and crop varieties. No longer able to avoid the question of how the Department would interact with indigenous farmers, Treub named Jacob van Breda de Haan, one of very few experts on indigenous crops, as his Inspector for Native Agriculture (Van Breda de Haan 1902). Van Breda de Haan would oversee agricultural demonstrations on Java. The newly created Experiment Station for Rice and Secondary Crops at Buitenzorg, a field research facility, was headed by J. E. van der Stok. While Van der Stok lacked the university training Treub prized, he earned Treub's respect, as well as a permanent appointment, after performing a series of impressive experiments on rice selection (Van der Stok 1910).

With the Inspectorate for Native Agriculture and the Experiment Station for Rice and Secondary Crops established, Treub laid plans for gradually increasing the size of the staff. These plans revealed one of the difficulties of implementing Treub's scientific standards for the Department, the problem of expertise. Who were the scientifically trained experts on whom Treub's plans rested? Van Kol had been right when he said that scientists had rarely concerned themselves with food crops. Despite the paucity of experts meeting Treub's standards, he remained convinced that he could not abandon those standards without damaging the Department's credibility. The Department grew slowly, producing only a very few experiments and demonstrations during its first several years (*Jaarboek van het Department van Landbouw in Nederlandsch-Indië* 1906-1910).

As Treub finally confronted the problem of disseminating (or "applying") his scientific results, he faced a far more difficult problem than he had first anticipated. He had two constituencies to satisfy: the European community, especially the currently influential Ethical group, who had to believe his approach would produce development, and the farmers who would have to accept the department's authority and trust their suggestions enough to adopt them. The system he ultimately designed highlights his thinking not only about disseminating knowledge, but also about the problems of establishing indigenous people's credibility and authority in a colonial society. His plans for agricultural demonstrations excluded farmers from direct participation in the process, relying instead on members of the indigenous bureaucracy to attend

demonstrations and spearhead the introduction of new techniques and technologies to farmers. Scientific improvers working under Treub's plan would operate at a considerable social distance from the farmers they were meant to help.

Restricting attendance at agricultural demonstrations flew in the face of convention. At a typical demonstration, an agricultural expert would encourage as many people as possible to observe or participate, so that they could see for themselves how well or how easily a new crop or technique worked. Knowledge about the positive results from a demonstration would ripple out through this network of observers and their contacts, spreading the new practice relatively quickly and easily.[4] Treub's approach more resembled a scientific experiment, in which scientists isolate their work from the public to prevent non-scientific observers from drawing incorrect conclusions, than it did a conventional agricultural demonstration (Collins 1988).

His decision to keep demonstrations private reflects Treub's reading of the social difficulties of establishing trust in a colonial society. European agricultural advice in the past had hardly been trustworthy, and science itself held no special authority among farmers who lacked scientific education. The problem of how to overcome the farmers' lack of trust in scientific agriculture was a familiar one among those promoting agricultural improvements elsewhere, including the Netherlands, but the specific social milieu of the Indies made it an especially thorny problem to resolve. Treub argued that the ordinary people in indigenous society would too easily misunderstand scientific demonstrations, leading to more distrust when the results did not live up to their unrealistic expectations (Treub 1908a). He needed a mediator capable of properly understanding the potential and limitations of the demonstrations, while also carrying enough personal authority with indigenous farmers to persuade them to adopt changes.

Elsewhere, agriculture experts solved this problem by increasing the familiarity between farmers and demonstrators, and relying on the example of those who *a priori* were more inclined to trust scientific results. In the Netherlands, improvers targeted large landowners, who were often more educated and more able to take risks than smaller farmers were. Agriculture teachers also offered formal and informal education for smaller farmers to prepare them to trust the demonstrations of scientists and experts. For Treub, neither of these solutions seemed applicable to the Indies because indigenous society differed so sharply from Dutch society. Few indigenous farmers had wealth and scientific education. Treub argued that agricultural training for the lower classes of indigenous society was impractical and ineffective. Poor farmers could hardly afford education, and wealthier people would not pay for an education that did not give their children the opportunity to move into lucrative positions in the civil service or private plantations (Treub 1910a: 75-83)[5]. Treub rejected Dutch methods as inappropriate for colonial conditions.

Instead of using familiarity, Treub sought to use distance to establish authority and trust. His model of translating authority from European experts to indigenous farmers drew strongly on the colonial tradition of indirect rule. Colonial officials had long relied on the personal and

traditional authority of indigenous leaders to implement and enforce the measures that the Dutch colonial rulers required. Treub adopted just such a mode of elite mediation to translate the authority of demonstrations to farmers. Indigenous leaders, who would be offered limited training in Buitenzorg, would attend the demonstrations and in turn use their political authority to push farmers to implement the improvements. Comparing this approach to more conventional, educational models of demonstration, Treub argued:

> Many years shall have to pass, due to the peculiar nature of our Native peoples, before the most persuasive plea from a Native agricultural teacher [. . .] will produce more than one suggestion coming from a Native chief. (Van Heutz 1908)

Under the assumption (similar to that made by Van den Bosch) that indigenous people would follow a strong, traditional authority figure, Treub argued that the indigenous elite's cooperation was the key to development (Treub 1910: 63-64). Although Treub was himself opposed to *perintah alus*, his plan did not eliminate it so much as displace it from European to indigenous officials. For Treub, borrowing the authority of indigenous leaders (and whatever powers of compulsion they had) solved the problem of how to convince people to accept change when science itself had no cultural authority. This move would produce a virtuous cycle, in which the influence of indigenous leaders would bring science into the *desa* (village), and the success and credibility of science would eventually bolster indigenous leaders' authority.

The final, crucial element of Treub's plan was the training for indigenous mediators, which would allow them to serve as a bridge between Dutch-speaking European technical experts and indigenous society. Historians have noted the critical role that mediators play in technological change and the case of agricultural change in the Indies is no exception (Cowan 1987). Indeed, mediators in the Indies were absolutely crucial for the success of any agricultural improvement project. Demonstration required explanation and interpretation, which necessitated conversations between demonstrators and observers. The European experts who supervised demonstration fields and those attending would not necessarily share an equal competence in the same language.[6] In east and central Java, people spoke Javanese or occasionally Madurese. In west Java, they spoke Sundanese or Javanese. Many spoke at least some of the *lingua franca* of the Indies, Bahasa Melayu, the language from which Indonesia's national language, Bahasa Indonesia, emerged. While many indigenous civil servants knew some Dutch, and many Dutch experts knew some Bahasa Melayu or Javanese, it remained questionable whether each group knew enough to communicate about possibly complex agricultural matters. Treub's emphasis on university-level scientific training meant that many of his hand-picked experts would have had little experience with any languages of the Indies before they arrived, and what they did

learn would be picked up mainly in day-to-day life (Fasseur 1994). Lacking a deep understanding of local culture and languages, they could not successfully run demonstrations without help (Treub 1910a: 60, 62).

Treub created a position of Native *mantri*, or agricultural assistant, to help him cope with the problem of linguistic and cultural differences. The *mantri* would be trained to allow him to bridge both worlds. Treub, having had some negative experiences with poorly trained indigenous assistants in the past, established rigorous qualifications for those who would serve as demonstration *mantris* (Treub 1910a). They would be required to speak, read, and write Dutch and had to pass agricultural training at Treub's school in Buitenzorg. They would also be fluent in one or more of the local languages, making it possible for them to translate both the explanations and intent of the agricultural experiment to the indigenous leaders at a demonstration, in a way impossible if they did not have both linguistic and scientific training. While they trained as assistants only, and were not in Treub's view qualified to conduct scientific investigations, they could supervise the fields and provide the linguistic and scientific expertise needed to make the demonstrations successful.

This was not a permanent corps of assistants, however. Rather, graduates of the school at Buitenzorg would spend several years as *mantris* and then move into more traditional positions in the *Inlands Bestuur*. They would then be replaced by others following the same path. Treub's plan added the innovation of scientific training to a largely traditional conception of colonial governance and indigenous social organization. His Department would add agricultural expertise to the training of some civil servants, who would be broadly disseminated across the islands through the *Inlands Bestuur*, turning indigenous bureaucrats into agents for the Department even after the end of their formal association. The *mantris*/civil servants would become another vector for Treub to establish the Department of Agriculture's credibility and authority across the colony.

Treub had argued in his proposal that the scientific basis of the Department of Agriculture alone would ensure its success. His complicated plans for dissemination belied that claim. Treub chose to draw on a conservative and traditional model of colonial relationships to facilitate the introduction of new technologies and techniques, maintaining the social distance between representatives of the government and the ordinary, non-elite people of the Indies. Despite the respect with which Treub was held, his approach provoked stringent criticism.

Close Contact, "Leering en Leiding," and the Critical Backlash

Treub's early leadership of the Department seemed to realize his critics' worst fears. Most of the Department's work was experimental, and demonstrations operated on a limited scale. The project of development – actually transmitting new ideas to indigenous farmers – generated

little attention. By 1908, the Department supported no more than ten demonstration fields on Java. A study published at the time pointed out that Java would need nearly 8,000 demonstration fields for it to have proportionally as many as the Netherlands did (*Welvaartcommissie* 1905: vol.5, 311).

Both the intensity of his efforts and his methods of outreach brought Treub criticism. While some found fault with the speed and breadth of development efforts, many complaints addressed his methods. In 1907, the Minister of the Colonies expressed his disappointment to Treub that more was not being done to help the indigenous people (Van Breda de Haan 1907). The Inspector for Native Agriculture, Van Breda de Haan, offered the first response during a visit to the Netherlands. While being careful not to criticize Treub, Van Breda de Haan did suggest that the Department needed more "daily contact" with the people, and he proposed changes to the Department that would increase interactions with indigenous farmers (Van Breda de Haan 1907). He pointed to the casual ways that the demonstration *mantris* had already done so (without Treub's knowledge, seemingly), and the successful spread of certain new techniques in the areas around the demonstration fields, a success that contrasted strikingly with the lack of any success elsewhere. The key phrase in Van Breda de Haan's proposal was "*leering en leiding*": teaching and guidance. The phrase brought to mind the Ethical ideal to "teach and guide" the indigenous people into full partnership in the colonial enterprise (Benda 1972). The paternalistic character of this thinking was clear in one bureaucrat's call for agricultural improvement driven by "fatherly care" (Feith 1903). To improve contact, Van Breda de Haan advocated two new categories of personnel: Native agriculture teachers (*Inlandsche landbouwleeraars*) and Dutch agricultural advisors (*landbouwadviseurs*). Each would be posted long-term to a specific district to learn about local agricultural problems and to become familiar with (and to) the local people. The *landbouwadviseur* for a given district, a European, would direct their work. Van Breda de Haan argued that the Department could add *landbouwadviseurs* quickly because they would not need the extensive scientific qualifications of the experts working at the main demonstrations or experiment fields. They would need merely a sound, general knowledge of agriculture and irrigation issues, good observation skills, and some knowledge of indigenous languages. The indigenous agriculture teachers could come from the currently existing agriculture school at Buitenzorg and need only be able to offer elementary agricultural education programs to farmers. Fewer qualifications meant more candidates, more outreach, and faster growth for the Department.

In response, Treub insisted on maintaining the role and training of demonstration *mantris* (so that they should proceed to the indigenous civil service), citing the Regent of Karangjar as an example of a successful, agriculturally knowledgeable leader (Treub 1907; 1910b). Neither would he consider *landbouwadviseurs*, who had as little training as Van Breda de Haan proposed. He conceded, however, that having some *landbouwadviseurs* in addition to the demonstration *mantris* was an idea with some merit. When Treub conceded these points, he defended

his change of heart not only in terms of the Department's speed of growth, but also in terms of building trust with the indigenous people (*Jaarboek van het Departement van Landbouw in Nederlandsch-Indië* 1908: xi). Citing budgetary restrictions, and what he viewed as insufficient numbers of qualified candidates, he appointed only four advisors to start the program. His lukewarm implementation was not surprising; Treub remained convinced that Van Breda de Haan's approach was simply ahead of its time for the Indies, primarily because he viewed the indigenous people as entirely resistant to change and to figures of authority outside their traditional hierarchies (Treub 1910a: 58-63). In Treub's view, the indigenous people were incapable of profiting from direct contact with experts in the absence of a recognized authority figure.

Along with his modest reorganization, Treub continued to position scientific research as directly improving indigenous agriculture. He highlighted the Department's efforts to select pure lines of more productive seeds for rice agriculture as an area in which research held special promise for the goals of improving yields and incomes (Treub 1908a). His critics, including many with strong commitments to Ethical reform, remained unconvinced. A case in point was the reaction to Treub's 1908 proposal to create an experimental rice farm (Van Heutz 1909). Treub aimed to use an experimental farm to practice rice agriculture on a larger scale than was possible in the limited experimental fields in Buitenzorg. On this 100-bouw farm, experimenters would investigate ways to make rice agriculture as efficient as possible, focusing especially on irrigation and selection tests. They would discard indigenous practices completely.

The Governor-General received largely negative responses when he sought outside advice on the proposal. One critic was H. E. Steinmetz, who as head of the colonial commission to investigate the declining welfare of the indigenous people, fell squarely in the Ethical camp (*Welvaartcommissie* 1905). Steinmetz criticized Treub for having wrong-headed priorities. He pointed out that the isolated rice farm would not produce any results that indigenous farmers could or would adopt. While not exactly accusing Treub of ignoring the indigenous people's needs, he argued that the results would only benefit the proprietors of private European estates that produced export rice.[7] The Department's duty ought to be to the indigenous community instead, Steinmetz reasoned (Steinmetz 1908).

Herman Lovink, the Minister of Agriculture in the Netherlands, joined Steinmetz in his indictment of Treub's rice farm. Lovink objected for much the same reason as Steinmetz had: Improvements needed to be within the means of indigenous farmers and familiar enough to be acceptable (Lovink 1909). Lovink, like Steinmetz, argued that the Department needed to work directly with Javanese farmers and learn more about their practices, rather than work in isolation from them, as Treub insisted. Referring to efforts made in the Netherlands for poor farmers, in which new methods were introduced gradually in combination with intensive contact and education, Lovink argued that the approach to agricultural improvement in the colony need not differ markedly (Lovink 1909). The Department ought to focus on teaching, the *leering en leiding* of Van Breda de Haan's proposal. Further, the social distance between the

people involved should be far less than that between Treub's agriculturally trained bureaucrats and the indigenous farmers. What was needed, to use a phrase that would appear repeatedly in discussions of development projects in the coming years, was "close contact" between the Department and the indigenous people. In Lovink's view, those who did the teaching should be drawn from people in the middle level of society. They could work directly with farmers and understand their circumstances and needs far better than elites could (Lovink 1911a). Lovink and Steinmetz both insisted the Department needed to produce a direct relationship between the Department and farmers. Ultimately, the Governor-General took the advice of Lovink and Steinmetz, and Treub never got his experimental rice farm.

The rejection of the rice farm was just one indication of official dissatisfaction with Treub's methods. When, in ill health, Treub announced his retirement from the Department of Agriculture in June of 1909, the government rejected Treub's handpicked successor J. C. Koningsberger, a zoologist, in favor of Herman Lovink (Zeijlstra, 1959: 103). With no advanced scientific training, but plenty of administrative experience in agricultural extension, Lovink brought to Department practices a focus on education and contact that dovetailed with emerging Ethical thinking on the proper relationship between the government and the indigenous people. Lovink would create an agricultural extension service that would work directly with farmers, thereby convincing Ethical advocates of the Department's ability to produce not just knowledge, but also development (Lovink 1911a; 1913).

One of Lovink's more far-reaching decisions was to make the position of agriculture teacher or *mantri* a permanent career, rather than a stepping-stone to the *Inlands Bestuur*, as it had been under Treub. In doing so, Lovink made it clear that he envisioned a quite different use of experts and expertise than did Treub. Lovink's professionals would stay with the Department and remain in close contact with farmers throughout their careers. Lovink feared that experts who moved into the upper echelons of the bureaucracy would lose their understanding of day-to-day agriculture and the needs of farmers, making a sound, enduring relationship impossible. Lovink's career indigenous-agriculture experts, if only in a small way at first, marked an important departure from traditional practices of colonial governance. Instead of working through or trying to reform the traditional indigenous bureaucracy, Lovink created a new class of mediators in the colony, and in the process, one of the first technical careers in government service available to indigenous people in the Indies. He insisted that indigenous technical experts, not bureaucrats, were essential for successful agricultural change. The Indies did not need more leaders, he argued, but "corporals, sergeants, and sons of workers" (Lovink 1909).

Lovink imagined a far different department than did Treub, in large degree because he had very different views about the kind of relationship between the department and the people that would best produce development. Unlike Treub, Lovink assumed that the indigenous people could be courted with education and guidance, and that their natural conservatism could be transformed through education and direct involvement in the project of development. Without

rejecting science (scientific work continued in the experiment fields of Buitenzorg), Lovink gave far more emphasis to the job of bringing farmers and technical experts together to change technology in the countryside.

Conclusion

Many Ethical thinkers shared the conviction that technology could be used to bring greater prosperity to the indigenous people, yet this agreement did not shut down political debate over the project of development. Disputes over the "developing" quality of the Solo Valley works and the Department of Agriculture reveal important differences of opinion among Ethical reformers about the nature of positive technological change. By debating the proper technologies to produce development, officials, experts, and observers simultaneously struggled to define what social characteristics Ethical development should have. As the Solo Valley works show, planners would not regard just any technical project that could potentially benefit the indigenous people as development. Two interrelated concerns, drawn from Ethical critiques of the past and hopes for the future, shaped these early debates about technological change: the scale of the technology and the closeness of the contact between improvers and the indigenous people of the Indies. Large-scale irrigation troubled many because of its unpredictability. Planners could not easily judge who would be helped or perhaps hurt, and the very scale and expense of the large-scale works made it impossible to "finish the job" all the way to the level of each village. There was simply too much distance, and too loose a connection, between the technology and the people for many to embrace it as development.

One characteristic missing from the Solo Valley project that proved of central importance in the debates over the formation, and then operation, of the Department of Agriculture was close contact with the indigenous people. While Treub enjoyed widespread support for his initial conception of a scientific Department of Agriculture, his critics became ever more vocal about the shortcomings of his system of outreach. The distant, indirect relationship between improvers and indigenous farmers troubled Ethical thinkers like Steinmetz and Lovink, who insisted that development required farmers and experts to interact directly, substituting among farmers a reasoned faith in modern technical experts, rather than blind adherence to authority. (In typical fashion, it seems not to have occurred to planners to ask whether they or the experts should in turn trust the indigenous people, although extension specialists would grapple with this question in later years.) Treub tried to convince his critics that the Department's success would rest on the quality of its scientific findings, but they remained stubbornly fixed on the question of outreach. The ultimate rejection of Treub's system of demonstration shows how these debates refined Ethical technical idealism. Rather than vaguely citing the promise of "technology" as was common at the turn of the century, reformers now required projects that

would produce both close contact and increased prosperity. For development planners in 1910, it was not merely technological change, but technological change facilitated through close contact between experts and the indigenous people that defined the project of development in the Indies.

3

Ethical Idealism in Practice: Technologies of Development and the Small Farmer

Understanding how high-level policymakers came to embrace the *idea* of close contact only partly explains why colonial native development took the form that it did in the Indies, especially its characteristic preference for small-scale projects. This chapter explores the equally crucial *practices* of development that the call for close contact brought about, that is, the day-to-day activities that took place in the fields of farmers and in small agricultural schools across Java. It was on the ground that experts took lofty Ethical ideals, and technical assumptions, and turned them into the technologies and working relationships that would define development in the Indies. This chapter explores the process by which experts and farmers put Ethical idealism into practice, including the ways that the demand for close contact shaped the choice of technologies, the methods of development, and the roles of participants.[1] Few, if any, colonial officials anticipated the dialog between experts and farmers that close contact would produce, nor the ways that the very definition of development would change on the ground as a result.

The Small Farmer Ideal in the Colonial Imagination

The Ethical reformers who advocated establishing the Department of Agriculture believed that agricultural change needed to reach a large audience if it was to produce development. Despite policymakers' tendency to refer to the indigenous people as an undifferentiated group, the real social structure of rural society was more complex (Soetrisno 1980; Elson 1984). To help the "indigenous people" in reality meant identifying which indigenous farmers would receive the Department of Agriculture's attention. Colonial debates mainly identified two groups: small farmers, usually working a hectare or less of land, who made up the majority, and the smaller number of larger landholders, who had more disposable income and often more local influence (Mansvelt and Creutzberg 1975). Under Lovink, the Department insisted that development technologies must work for almost any farmer, large or small. In effect, they targeted the common denominator of landholders with small- to average-size holdings.

This decision might seem mere common sense. Much food production was distributed across small farms; therefore, a noticeable increase in the food supply would be possible if food

Images like this one (c. 1900) of farmers working in a flooded rice paddy emphasized the small-scale of Javanese farming. Source: Collection of the KITLV, Leiden, The Netherlands, 3745

producers could demonstrate even modestly improved yields (Boomgaard and Van Zanden 1990). Yet, popular representations that portrayed Javanese farming as small-scale and poorly capitalized may also have influenced policymakers. The common picture of Javanese farmers that appeared in Dutch writings of the period showed a large farm family working a small plot of land, selling only what surpluses, beyond their own subsistence, they might occasionally have.[2] This representation, while not entirely false, did not do justice to the complexity and variability of farming practices across Java, much less the rest of the Indies, but had the virtue of being easy to grasp. Such works ignored the existence of larger farmers almost entirely and tended to oversimplify or misunderstand the nature of rural social hierarchies (Soetrisno 1980).

A good example of the Dutch view of Javanese farming before the Department of Agriculture is the comprehensive study made by H. C. H. de Bie in 1902. De Bie confirmed the popular image of indigenous farming as a small-scale enterprise, painting a picture of the "average" family farm as one in which families worked small pieces of land, which they might own outright, or which might be subject to communal ownership.[3] He attributed the small size of

farms to both the tradition of dividing land equally among a farmer's sons and the ongoing decrease of unclaimed, arable land on Java. These farmers were largely independent operators who hired outside help from the village during times of need (typically during harvests) and grew some portion of their food crops (especially rice) for private use, and some for sale. De Bie also explored the village relationships that framed a farm family's existence. Digging irrigation ditches, for example, was the job of every farmer, but the village residents had to cooperate on rules for water use, and for building common irrigation works that fed the entire village. Within the village, land distribution frequently mirrored the social hierarchy, as village chiefs and other important members of society usually owned the most productive lands closest to irrigation sources. Village life was by no means egalitarian, but De Bie's depiction emphasized cooperation and the lack of extreme stratification in rural society. Java certainly had large farmers who let their lands to tenants, but it was by no means a land of tenant farmers.

De Bie portrayed the small farmer as the Javanese agricultural everyman. However, this did not mean that there were no large landowners on Java. Both formally and informally, large landowners did exist, although they rarely rated attention from either scholars or the popular press during the colonial era (Soetrisno 1980). Informally, some farmers whose sons or sons-in-law were *de jure* owners of property actually worked the land in accordance with the patriarch's interest, acting more as tenants than as the individual operators of De Bie's account. Other large farmers acquired land simply by buying it as it became available, regardless of whether it was contiguous with their other holdings, creating a patchwork of land holdings that were large, but due to their physical separation and operation by tenants, largely invisible as such to outside observers (Kern 1908). While these landowners did not own land on the scale that large farmers in the American Midwest might hold, or even as much as the average sugar planter could lease for sugar crops on Java, they nevertheless held far more land than the small farmer's one hectare average.

Even agricultural experts tended to ignore large landowners (Seotrisno 1980). Treub gave no attention to the presence of large landholders in *Landbouw*, his comprehensive discussion of Indies agriculture (and defense of his own views on the subject). Treub argued that improving indigenous agriculture was so difficult because it was the province of the "the little man," whom he viewed as superstitious and susceptible to even the most arbitrary demands of authority figures (Treub 1910: 29). The few who did recognize the presence of large landholders in indigenous society gave reasons why large farmers would not or could not become a conduit for change, as their counterparts had done in the Netherlands (Bieleman 1994). In a contribution to the *Investigations into the Declining Welfare of the Native People*, R. A. A. Achmad Djajadiningrat, a highly respected member of the *Inlands Bestuur*, identified four categories of farmers: those whose land was worked exclusively by tenants, those who worked their own land, those whose land was worked partially by themselves and partially by tenants, and those who had no land of their own, working exclusively as tenants. Djajadiningrat pointed out that those

who did not work their own land usually had nothing to say about the technical approach to farming; they were merely landlords. The tenant relationship in terms of farming method was an independent one: The family doing the farming had full responsibility for the methods they used. Large landholders were in fact so distant from the actual practices of farming, that on Java "there is only one sort of farmer, the small farmer" (Djajadiningrat 1908: 3). Only small farmers, whether owners or tenants, could influence the practices that the colonial government hoped to change.

There were dissenting voices, however. A member of the commission identified in the *Investigations* only as Kern (but who may have been H. Kern), cited the large landowners in Priangan, the Sundanese area of West Java, as models for the positive role that large landholders could play in development (Kern 1908). Kern agreed with Djajadiningrat that in technical method, if not in landownership, most farmers on Java were small farmers. Unlike Djajadiningrat, however, he argued that these larger farmers had exercised influence over their holdings, becoming the driving force behind the widespread adoption of new crops in the area of Priangan. He argued that these farmers needed only to be educated, especially in the advantages of intensive agriculture, in order to exercise a positive influence on their tenants and fellow landholders.

Kern's opinion was exceptional, and it is difficult to evaluate his claims in the absence of any other evidence from the Priangan region during this period. In any event, the idea that development could usefully target large or wealthy indigenous landowners would not return until the 1920s. In the 1910s, attending to the majority of small farmers better fit Lovink's practical and idealistic aims. Helping small farmers would increase the food supply and incomes across the island, as well as increase the tutorial contact with the "ordinary" indigenous people that Ethical reformers cherished, breaking down the older colonial practice of having contact only with elite or powerful members of indigenous society. Critics would attack projects that did not appear to be helpful to the ordinary farmer, as was seen in the last chapter with Treub's experimental rice farm. For the first fifteen years of the Department of Agriculture's efforts, Djajadiningrat's logic would prevail.

Constructing a Developing Technology: Line Selection and the "Better Seeds" Philosophy of Change

Defining small farmers as the primary targets for development in the Indies shaped both Treub's and Lovink's technical choices. In addition to taking small farmers' lack of capital and small landholdings into account, Lovink and Treub also made assumptions about the character of small farmers and their social environment when deciding which technologies would best suit the project of development. The assumptions they made were common among Europeans in the colony and largely uninformed by discussions with the farmers themselves. Treub criticized

farmers' lack of "economic consciousness," claiming that farmers would be difficult to help because they did not think about the economics of farming in ways that made sense to Europeans (Treub 1910: 29). European observers typically attributed this seeming lack of rationality to farmers' stubborn adherence to tradition and irrational superstitions (De Bie 1902; Paerels 1916). Historians and anthropologists have since repeatedly shown the clear logic behind traditional farming practices in many parts of the world, belying the claims of colonial observers who carried their own biases in favor of an often ill-conceived modernity (Scott 1994; Fairhead and Leach 1996). Nevertheless, the assumption that farmers would resist change (for whatever reason) was probably a safe one. State-driven agricultural improvement projects around the world tended to meet resistance from farmers (Fitzgerald 1990; Scott 1998). Because farming carries such enormous risks under the best of circumstances, farmers are sensibly cautious about change. The colonial assumption that resistance in the Javanese context was based primarily on irrational superstition and conservatism, however, played an important role in Treub's and Lovink's views about which technologies would suit the Indies.

This is not to suggest, however, that there is some universal, deterministic relationship between an agricultural technology and its suitability to particular farmers. Technologies are flexible, sometimes even more so than their designers realize, and are adaptable to a range of conditions (Pinch and Bijker 1989; Bijker 1995). In any given setting, people interpret the character and applicability of technologies, and this flexibility means that people may have different interpretations about the best uses of a technology, or the best way to benefit from it (Kline and Pinch 1996). It is important, therefore, to investigate how and why people interpret the meanings and uses of technologies the way they do to understand the significance of a technological choice in a particular context.

For the project of development, the critical characteristic that experts and policymakers believed would make a technology suitable was an ability to create higher yields (which presumably would increase incomes) on small farms. This meant that farmers had to be able and willing to adopt the technology. One without the other would not work. For example, Lovink was enthusiastic about the technological possibilities of synthetic fertilizers, but was more cautious about their immediate usefulness in the Indies due to their high cost (Lovink 1909; *Jaarboek van het Departement van Landbouw, Nijverheid en Handel in Nederlandsch-Indië* 1913: 89). This did not prevent him from having the Department run experiments on fertilizers, or from considering ways to bring down the price of using them (*Jaarboek van het Departement van Landbouw, Nijverheid en Handel in Nederlandsch-Indië* 1913: 88-90, 138-145). Despite the improved harvests the tests often showed, they simply remained too costly for small farmers, even when agricultural credit was available (*Jaarverslag van het Landbouwvoorlichtingsdienst* 1914: 74-77, 143-156). Fertilizers might have been good for increasing yields, but Lovink did not envision them as useful technologies for development in the Indies. Likewise, any technology or technique that farmers were unwilling to adopt would be equally unsuitable.

Both Treub and Lovink advocated line-selected or "purified" varieties of crops as a promising development technology for the small farmers of the Indies[4] Variety selection involved creating a homogeneous population of seed (one in which every seed would be of the same variety) from the more ordinary, heterogeneous populations that farmers used. Under everyday conditions of agriculture, varieties of seed ordinarily used and sold as such tended to be somewhat heterogeneous for several reasons. Rice is subject to a remarkable amount of genetic variation, yet not all varieties display dramatic differences in appearance or character, for example, in their need for water or the length of their growing season (Grist 1975). Closely related varieties could therefore appear as a single variety in the market without troubling the average farmer. What a scientist saw as heterogeneous might seem homogeneous enough in day-to-day use. Nevertheless, even rather small differences in variety could create problems in the field, including uneven ripening (making harvest difficult) or spontaneous, usually sterile, hybrids. Such problems would decrease the crop's yield and make cultivation and harvest more difficult.

To produce a truly homogeneous population of rice seed at the turn of the twentieth century required several generations of careful breeding, as well as observation and judgments on the part of experimentalists. Experimenters would sow a small field with a population of seed that contained the variety of interest. They would identify true representatives of a variety and remove all others from the field until they obtained a pure stand of rice. This stand had to be protected from other kinds of rice to prevent spontaneous crossbreeding. They would repeat this process for several generations until the seed seemed to be breeding true – a situation that, in the years before genetic sequencing, relied on the experimentalist's scientific judgment. The seed from this final crop would be certified as homogeneous or purified. Such homogeneous seed would produce, in theory, a uniform crop, eliminating sterile hybrids, uneven ripening, differences in response to water, and other variations.

It is a fair question to ask whether such selected varieties ought to be considered technologies. I consider them technologies because they require human intervention to both define and materialize. Experts had first to define what characteristics were inherent to a variety (something that required careful judgment and a certain amount of guesswork) and then remove any plants whose characteristics did not match those on the list. The line selection process therefore created real objects (obviously constrained by the variation present in the crops) based on an abstract, human-defined classification system (Bowker and Starr 1999). Ensuring that varieties remained pure (that is, making sure that no new varieties were accidentally introduced into the population of seed) required special cultivation techniques: The ordinary practice of farmers taking next year's seed from this year's harvest would not suffice for duplicating truly homogeneous seeds. Duplicating seed would therefore usually happen only at specially designated facilities, such as the seed gardens established by the colonial government. Therefore, although variation

in plants is a natural characteristic, selected varieties, as colonial scientists understood them, could not exist without constant human intervention, and therefore they should be studied as technologies.

Treub may have developed his enthusiasm for the potential of selected varieties in part because of the growing international prominence of plant breeding among agricultural scientists and the successes they enjoyed in creating higher-yielding crops (Fitzgerald 1990; Storey 1997). However, Treub made his case for selected varieties not only based on the technology's generic potential, but also in terms of its particular fit in the context of Indies' native development projects. Treub created what I call a "better seeds" philosophy for development, in which selected varieties of seed would become good development technologies. Simply give farmers better seeds, he argued, and they would easily improve yields and standards of living, without provoking resistance:

> As difficult as it is to hand them [indigenous farmers] more "soesa"[trouble] for better, but more time consuming cultivation of soil, seeds and plant material, so is it easy to get them to give up their traditional varieties and exchange them for others, so long as it is clearly explained that these, without any more difficulty, will yield better and more product. (Treub 1910: 46)

Treub further argued that this characteristic of farmers (the ease with which they would adopt a change if it required no more effort on their part) would lend selected varieties a "special practical significance" for developing indigenous agriculture on Java (Treub 1910: 46). While the idea of a homogeneous variety was not necessarily meaningful to Javanese farmers in the same way that it was to European scientists, the idea of varieties was commonplace. Javanese farmers had long made a resource of the natural variability of rice. They distinguished rice varieties according to, among other qualities, whether it was glutinous or non-glutinous, whether it was awned (that is, whether it had a bristled outer coating), its suitability for irrigated or non-irrigated conditions, and perhaps most importantly, its approximate time to harvest (De Bie 1902: 80-94). The indigenous people of Java often found rices with longer growing seasons (*padi dalem*) to be more flavorful and generally of higher quality than early-ripeners (*padi gendjah*), and there were times when an in-between harvest time (*padi tengahan*) might be more useful. Sometimes farmers chose fast ripeners to grow a second crop of *padi* during the dry season (*padi gadoe*). Farmers differentiated rice by characteristics and participated in systems of exchange to optimize their choice of variety. One nineteenth-century writer mentioned that farmers responded to particularly difficult diseases or insects by sending for new seed from remote areas (De Sturler 1863: 545-546). Treub's view that farmers would readily accept new varieties therefore had some basis in ordinary, indigenous farming practices.

Implicit in Treub's enthusiasm for this technology was his assumption that, in the short term, development would work best if it did not make dramatic changes to farming organiza-

tion or practices on Java. One needed only to switch out the seeds to take at least the first steps toward development. Selected varieties could conceivably be adopted by any farmer on Java, and as Treub argued, any farmer would be likely to accept them. Given the concerns that many had about population growth and the fragmented nature of land holdings, selected varieties offered an appealing possibility for coping with the need for more food and for generating greater economic well-being for the indigenous people, by spreading the ability to grow more food to a large number of farmers.

While Treub emphasized the simplicity of selected varieties as a development technology, in reality the Department would have to exert considerable effort to create a system in which selected rice varieties could become an everyday part of farming on Java. In order for selected varieties of rice to function as development technologies, they needed to become part of the farming system, that is, part of a stable network of technologies, people, and places, including agricultural experts, experimental sites and practices, a classification system, Javanese farmers willing to use new varieties, and rice seed itself (Latour 1996). In the absence of a stable network supporting them, selected varieties would be useless for the project of development.

Building a Network for Selected Varieties

Characteristically, Treub focused primarily on the science of selection. In 1905, he requested that the fifteen Residents (the title given to the head of an administrative region) of Java and Madura send him samples of the different sorts of rice grown within their districts. In 1907, after collecting a substantial number of samples, he directed J. E. van der Stok, then Assistant for Native Agriculture at the Experiment Station for Rice and Secondary Crops (*Het Proefstation voor Rijst en Tweede Gewassen*), to use them to determine how many different varieties of rice were cultivated on Java (*Jaarboek van het Departement van Landbouw* 1907: 102-103). In doing so, Van der Stok had to synthesize a classification system for rice, as there was no single, internationally accepted, scientific classification system for rice available. He defined the properties intrinsic to each variety, drawing on distinctions made by the indigenous people of Java, as well as Japanese, German, and Italian classification systems. His final set of categories included, for example, whether a variety belonged to the family of ordinary, glutinous, or tjere rices (where tjere was seen as a kind of half-ordinary, half-glutinous rice), the color of the grains, and whether or not the grains had awns (*Jaarboek van het Departement van Landbouw* 1907: 102-104; Grist 1975: 101-106). Van der Stok's system provided criteria to uniquely identify varieties across Java (he identified 800 as of 1905), assigning numbers as well as names because the same variety might go by a host of local names. This central, comprehensive index of rice varieties established the criteria by which experts could identify good examples of a variety dur-

ing the selection process. Not only could one identify, for instance, *padi baok* by its established characteristics; one could also go through an experimental stand of *padi baok* and know the criteria for selecting out the plants that would ultimately form the basis of purified stock.

Van der Stok's classification was critical to establishing the technological project of development in two ways: by creating a system in which certain rice varieties could be identified as part of the development process and by creating the varieties themselves from the heterogeneous populations of seed available on Java and from foreign sources. By classifying rice varieties, Van der Stok defined the raw materials of development according to Treub's better seeds philosophy, and made it conceivable that for each identified variety, scientists would be able to decide which would contribute to development, based on their understanding of the variety's characteristics. The classification system defined rice varieties in the abstract, and line selection using that system transformed these abstract definitions into real, usable populations of seed.

Van der Stok's system certainly performed the task of simplification that James Scott (1998) identifies as so essential to the high modernists' agenda. Because Treub imagined that exchanging seeds would be a straightforward process, a simplified view of rice farming in terms of varieties of seed seemed necessary for the project of development. There is reason to suspect, based on Treub's writings, that he may have imagined development as a reduction of this complexity by replacing the plethora of varieties used across Java with only a few, higher-yielding types, although he never said so directly. Had that occurred, development through selected varieties on Java would have been a large-scale project by my definition of that term – a single or small number of solutions (in this case varieties) meant to work over a large geographic area for a large number of farmers. It could be argued that the later Green Revolution in Indonesia was just such a large-scale project. That colonial agricultural development did not turn out this way hinged on the actions and beliefs of Treub's successor, Lovink.

Lovink agreed with Treub that selected varieties held great potential, but was not so convinced that indigenous people would readily adopt them. Nor was he certain that they would be able to maintain the purity of the lines in their ordinary practices:

> With the systematic cultivation of new productive races much has already been accomplished, but one must not forget that the cultivation of such purified races only finds a place if the handling [of them] on the farm is suitable. On extensive and carelessly operated farms, the cultivation of such purified varieties is by no means recommended; disappointment is all too frequently the result and it would better serve them to continue the cultivation of old landraces. (Lovink 1909)

A labeled specimen of the rice variety padi glindoeran from the Seed and Selection Garden at Buitenzorg, 1914

With that caution in mind, Lovink nevertheless endorsed selected varieties for development in the Netherlands Indies when he took over the Department's leadership in 1910. Lovink already had an answer to his own objection, inspired both by his experiences in the Netherlands and the Ethical clamor for close contact with the indigenous people. To make a selected variety a functional development technology, the Department had to do more than purify seeds; it also had to train farmers to use them properly. Under Lovink, the technological network to support selected varieties expanded outside of Buitenzorg and included new agricultural extension specialists as mediators to help teach farmers to cultivate selected varieties in ways that preserved their higher yields. The network that Lovink constructed to support selected varieties as a development technology would ultimately have far-reaching effects on the Department's relationships with farmers, the kind and extent of knowledge about Java produced by the Department, and expert attitudes towards the question of scale in Indies development projects.

Bringing Development to the Farmer and the Farmer to Development: Proefvelden, Seed Gardens, and Schools

Lovink's interest in the process of dissemination and his insistence on making ordinary farmers part of development harmonized well with Ethical calls for close contact with the indigenous people. Given his skepticism about the ability of better seeds to produce development without education, it is clear that close contact was not just socially desirable; it was technically essential (Lovink 1911a; 1911c). Like Treub, Lovink may have been influenced by the growing attention given to agricultural extension and education programs internationally, but, also like Treub, he defended his system in terms of its usefulness in the Indies:

> As concerns farm people themselves, while conservatism, routine, tradition, frequently fatalism, and other factors are a hindrance to the introduction of improvements in their operation, above all the main cause of the backwardness of Native agriculture lies in the level of development of the actual farmers. (Lovink 1911a)

Education and extension, he argued, would provide the benefits of development that Treub "fruitlessly sought" (Lovink 1911c: 3). Education would bring up the "level of development" among farmers, in part by encouraging them to abandon superstition, routine, and fatalism and motivating them to accept new technologies. Elementary, informal education that emphasized practice and demonstrations would be the best method to reach adults. For younger children, he favored the expansion of agricultural schools that would take malleable young minds and expose them to scientific agriculture (Lovink 1911b).

Lovink established a *voorlichtingsdienst*, literally an enlightenment, or extension service in late 1911, both to disseminate new technologies to farmers and to provide the informal, demonstrative education he believed farmers needed in order to make development possible. In doing so, he drew on models of agricultural extension practiced elsewhere in the world, believing them to be reasonable and appropriate for the Indies. The Dutch system of agriculture teachers (*landbouwleeraren*) had come from the German idea of the traveling agriculture teacher, or *wanderlehrer*.[5] Lovink's extension work also resembled Seaman Knapp's efforts to fight the cotton boll weevil in the southern part of the United States (Marcus 1985; Rasmussen 1989). Organizationally, however, the Department's extension service differed from these examples. The U.S. system of extension was largely decentralized and affiliated with local universities and states rather than directly with the U.S. Department of Agriculture. In both the Netherlands and Germany, extension had started as a private initiative, with the state only later starting to play a larger role. From its inception, however, development in the Indies was a centralized state project. Unlike other countries, extension had no pre-existing grassroots constituency; the only group in the colony with a motivation to produce systematic, widespread agricultural change was the state itself. The extension service would therefore spend a great deal of time grappling with the difficulty of creating demand for their services from the top down.

Lovink organized the extension service with separate career tracks for *Inlanders* (Natives) and Europeans, mirroring the organization of the colonial civil service. In 1912, there were nine European agricultural experts, and twenty-six indigenous agricultural experts. Lovink expanded the service quickly, discarding Treub's practice of hiring only those trained in the pure sciences at universities. Drawing on graduates of the technical agricultural high school in Wageningen in the Netherlands (which later became Wageningen Agricultural University), he was able to expand the number of European agriculture teachers (a new title for agriculture experts) in 1918 to twenty-two, with eleven aspiring teachers still in training. He reformed Treub's training school at Buitenzorg to support the ongoing education of Native agriculture teachers as well. By 1918, while the number of existing Native agriculture teachers had dropped slightly to twenty-four, seventeen aspiring agriculture teachers were completing the last stages of their education before getting full-fledged positions in the Department (*Regeerings Almanak voor Nederlandsch-Indië* 1913; 1918). It is worth noting here that the titles for various members of the extension service changed frequently over the course of the 1910s and 1920s. Rather than confuse the story by trying to explain every bureaucratic title change, I will refer to those in the extension service as simply "extension specialists" or "extension experts" when their particular title is not relevant to the story at hand.

With his expanded staff, Lovink dramatically changed the practice of demonstrations from Treub's unsatisfactory model. He dismantled the permanent demonstration fields, replacing them with multiple, temporary *proefvelden*, or test fields across the islands (*Verslag Landbouwvoorlichtingsdienst* 1912). Extension staff ran multisite variety comparison tests for rice and

other crops, fertilizer tests, and demonstrations of dry nurseries for rice (a cultivation technique that could improve yields in some situations). The sizes and dispersions of the tests varied. A test might have as few as one or two sites, like a variety test conducted in the Kraksaän area of Pasuruan in 1912 (*Verslag Landbouwvoorlichtingsdienst* 1912: 55). Alternatively, it could be quite widespread, like the tests conducted on the Carolina, Pelak, and Skrivimankotti varieties of rice in Madiun in 1914 that took place on thirteen different fields (*Verslag Landbouwvoorlichtingsdienst* 1914: 151). Farmers volunteered their land and sometimes their labor, and received some small compensation, usually protection from any losses incurred because of the trial and the promise that they could retain any profits. Extension specialists encouraged farmers to attend formal demonstrations and informally visit the sites. Such demonstration sites were not permanent; a trial might run for as short as a single season, or for as long as three or four years, although rarely for longer than that. As he increased his staff of extension specialists, both indigenous and European, Lovink could conduct a larger number of modest trial fields than Treub had ever tried. The system of cooperation with farmers made it possible for the Department to afford far more trials than they could if they had to rent land, but the practice also responded to the desire to make sure that development technologies and practices could be reasonably adopted by ordinary, small farmers. Running demonstrations on the farmers' own fields, often with labor provided by the farmers and their families, would prove that the technology was indeed accessible.

Trial fields could not provide complete support for introducing line-selected varieties, however, because seed had to be produced under controlled circumstances to guarantee its homogeneity. Lovink persuaded the Governor-General to support the creation of two seed gardens – at Ngandjoek (in Kediri) and Simowahoe (in Surabaya) – in 1912 to provide this necessary support for line-selected varieties (*Jaarboek van het Departement van Landbouw, Nijverheid en Handel* 1912: viii). Both gardens would run variety trials and use their extensive land to duplicate and distribute line-selected seed to area farmers (*Verslag Landbouwvoorlichtingsdienst* 1912: 1-2). The combination of regional *proefvelden* and seed gardens (Ngandjoek and Simowahoe were intended to be only the first two of many more of these), supported line-selected varieties as development technologies by providing the means to find useful varieties and introduce them at the village level.

The success of development projects relied largely on the Native extension specialists. By establishing positions for indigenous agriculture teachers, Lovink had created a place in the Department of Agriculture for indigenous people who were trained in the sciences. While their career paths were greatly limited compared to those of European experts, Native extension specialists nevertheless handled most of the crucial mediation between Europeans and the indigenous people; with a foot in both indigenous and European worlds, they became the human conduits through which development would pass. They provided the most direct link between farmers and the Department and communicated the ideals and mission of development

to farmers in a way that Dutch extension specialists mostly could not do. While they rarely participated in the highest levels of development planning, their actions, and the relationships they formed in the villages, vitally shaped the practical reality of development.

The responsibilities of any given Native agricultural expert, or Native agriculture teacher, comprised two major areas: education and oversight of field trials. In keeping with Lovink's priority of education, Native agriculture teachers gave public lectures and held meetings and discussions with local farmers. They also oversaw the day-to-day operations of trial fields, which included ensuring the proper maintenance of the fields and checking that farmers followed acceptable technical practices, such as keeping tested varieties separated so that estimates of productivity would be reliable. As an example of Native agriculture teachers' typical work, consider the activities of M. Oemarsanoesi, posted to the Yogyakarta/Surakarta district in 1912. At the beginning of the year, he was overseeing selection trials in Yogyakarta (continued from the previous year), and then in March he began to supervise the establishment of new tests in Kedu (in the same region). Several times, he provided supervision for the seed gardens at Patukan and Randu-Gunting, filling in for a sick overseer. He edited pamphlets and gave talks on the goals and organization of experiments, rice selection, and fertilizers, among other topics. In September 1912, he made a study trip to the agriculture schools in Purworedjo, Kopo, and Plumbon, in preparation for designing a study plan for a new school at Wuluhadag. During this same trip, he investigated crops at the above schools that might be useful in the area of Yogyakarta, bringing back some onion seed for use at the Wuluhadag school. He wound up the year by administering entrance exams for aspiring students at Wuluhadag, with the assistance of the aspiring agriculture teacher R. Soerjo (*Verslag Landbouwvoorlichtingsdienst* 1913: 160).

As is clear from M. Oemarsanoesi's exhausting schedule, indigenous extension specialists were essential to agricultural development, especially when it came to operating the elementary agricultural schools. In 1912, the Department established the first entirely government-supported agricultural school at Wonosobo, and provided a subsidy for a private agricultural school at Soreang (near Bandung). These schools were intended to teach young men how to become better farmers. Their fast growth during the 1910s suggest that such schools were popular, especially considering that most were only partially subsidized by the government, requiring that students pay fees to attend. By 1915, there were eight new schools on Java, including one school financed by the Sultan of Yogyakarta and one by the Susuhunan of Surakarta. Clearly, enthusiasm for agricultural education was not limited to the Department of Agriculture.

For the schools to do their work for development, however, they had to be closely controlled. The Department of Agriculture dictated the courses of study, and indigenous instructors trained at the Department's two-year agricultural middle school provided most of the teaching manpower. As Lovink had argued that these schools were intended to improve farmers' level of development, farmers' sons were the most desirable students. Despite the visibility of women in many aspects of agricultural production (especially rice production), the agriculture schools

Indigenous agriculture school c. 1915.
Source: Collection of the KITLV, Leiden, The Netherlands, 2980

did not train girls, nor did they expend much effort on those areas of production that women typically handled. Training included basic education in areas like botany and plant physiology; practical education in cultivation techniques and fertilizers; exposure to new crops like peanuts, cassava, and dry-season vegetables; and the techniques of comparison tests (*Verslag Landbouwvoorlichtingsdienst* 1912: 14-15; 1914: 104-108). The schools operated their own trials similar to those conducted by extension specialists. Sometimes students were allowed to keep a portion of the proceeds obtained from selling the crops they raised at their school gardens, and at a school in Purworedjo, the students even operated a store for the products they had grown (*Verslag Landbouwvoorlichtingsdienst* 1914: 106). The Department hoped that graduates would return to their villages, providing a first generation of developed farmers receptive to the Department of Agriculture's way of defining and solving problems.

Education programs did not always work out in quite the way officials hoped, however. The schools were very successful at enrolling students, but these students did not necessarily return to their villages to farm. Rather, many parents enrolled students with the expectation that their children would be able to land relatively lucrative and stable positions with the government or on plantations. Rather than graduates becoming informal farmer/demonstrators in their home villages, they were more likely to take on formal roles as agricultural mediators, either as educators or, with more training, as Native extension specialists. In some cases, Regents or village officials who had taken an interest in agricultural extension expected these graduates to do more than return to farming and employed them to perform demonstrations as a full-time occupation in area villages (*Verslag Landbouwvoorlichtingsdienst* 1913: 141).

Yet this does not mean that agricultural education only existed to train new agricultural extension specialists, thereby merely reproducing the extension service. Agriculture schools reached more people than just the children who attended classes. Because the Department emphasized practical training, often requiring students to run their own demonstrations and trials, schools became another set of sites where local farmers could see demonstrations. Often, farmers interested in new varieties of rice or other crops would take their requests first to the local agriculture school. Farmers also could attend lectures specifically designed for adults. Numerous Native *landbouwleeraren* reported good attendance at discussions on subjects like the purpose of variety trials and the goals of development, even in areas without active *proefvelden*. These meetings or short classes may have had audiences that extended beyond farmers as well. In Yogyakarta in 1913, where the *Verslag Landbouwvoorlichtingsdienst* indicate that discussions and public meetings were especially popular, M. Oemarsanoesi received a request from the Srandakan chapter of *Budi Utomo*, an indigenous intellectual organization concerned with the promotion and modernization of Javanese life, to hold a class for adults on "general development, in particular those areas in which the welfare situation could be improved" (*Verslag Landbouwvoorlichtingsdienst* 1914: 117). Historians usually characterize *Budi Utomo* as a group of intellectuals concerned with Javanese culture. That they would request a lecture on development from an agriculture teacher suggests that development through technological change was an idea that had captured their interest (Nagazumi 1972; Shiraishi 1990). Indigenous agriculture teachers therefore reached deeply into Indies society and provided the primary means for Dutch ideologies of technological development to enter indigenous life.

The Fruits of Close Contact: The Influence of Farmers and the Growing Appeal of Small-scale Technological Change

In expected and unexpected ways, Lovink's approach to agricultural outreach changed development in the Indies, both in terms of the scientific knowledge produced and the methods of outreach employed. While Lovink's expanded extension service satisfied Ethical political demands for close contact with the indigenous people, the indigenous people in turn started to shape the Department's technical approach to development, an outcome high-level planners never expected. The loci for this change in knowledge production, participation, and attitudes were the *proefvelden*.

Lovink's *proefvelden* were meant to serve as demonstration fields, but they developed, informally it seems, into locations for more than simply demonstrations and observations.[6] The Dutch word *proef* literally means test or trial, and department agricultural experts soon recognized the value of using their new, widely dispersed *proefvelden* to explore systematically the outcomes of new agricultural technologies and techniques in a variety of ecological settings. Demonstration sites became more experimental than purely demonstrative, and outreach personnel became actively involved in creating scientific knowledge, not simply disseminating it. That agricultural technologies needed to suit the natural circumstances in which they were used was not a novel observation by Lovink or his specialists. The explanatory memorandum circulated to the *Tweede Kamer* in 1904 in support of the proposed Department of Agriculture pointed out:

> The requirements and characteristics of the different rice types and varieties [with respect to improving agriculture] need to be worked out. It is necessary to understand the conditions and relationships of soil and climate in the different areas of Java, so that in that connection local expert observation needs to be organized. (quoted in Treub 1908b)

Treub, however, had shown little inclination to do experimental work anywhere except in his experiment fields in Buitenzorg. His public demonstrations were always meant to be what Harry Collins (1998) has called "public displays of virtuosity" – they were meant to show what a skilled practitioner could do with new technologies. Outcomes in public displays of virtuosity are known ahead of time. Lovink's *proefvelden*, in contrast, became public sites of experimentation, where outcomes were not known and the collected data informed further scientific investigation (Collins 1988). While still used for demonstrations, experts quickly recognized the value of gathering geographically specific data about the natural, technical, and social practices of farming across Java.

Rice variety demonstrations/trials provide a good example of the kind of activities that spurred the Department to give greater attention to the experimental possibilities of the

proefvelden. In 1912, shortly after the extension service was established, only the Yogyakarta/Surakarta and Madiun/Kediri districts operated extensive variety trials (of the eight areas reporting in the yearbook for the agricultural extension service), although several of the others performed small tests. By 1917, at least six of eight districts reported rice variety trials in their regions. An example of a typical, multi-year selection trial was that which took place in Ngringin in the Madiun/Kediri district between 1911 and 1915 under the *landbouwleeraar* B. H. Paerels. The object of the trials was to compare different rice varieties, varying in number from six to eight, in terms of productivity, with the aim of showing farmers the purified lines' exceptional yields. Extension specialists chose several local varieties, as well as varieties from the Ngandjoek seed garden for this end (*Verslag Landbouwvoorlichtingsdienst* 1912-1914). The reports conveyed as much interest in the local varieties as the line-selected ones, at first mainly to set some useful benchmarks for identifying varieties that might be good candidates for later selection. A look through the reported results of many variety trials shows that the line-selected varieties did not always outperform their local counterparts, and yields sometimes differed dramatically from place to place, even when the locations were only a few kilometers apart. Results like this encouraged more experimental comparison tests and detailed reporting from the clusters of *proefvelden*, providing new data that emphasized the marked variability of the ecological conditions of farming across Java. They also provided useful information to scientists back in Buitenzorg who were investigating the factors that affected rice yields, including soil types and irrigation practices (Mohr 1922; Van der Elst 1916a; 1916b).

The results from the *proefvelden* fed a growing conviction among agricultural experts that improving rice productivity and producing development on Java required not a small handful of high-yielding new varieties used across the island, but many local solutions tailored to a given area's specific conditions. They began to embrace a smaller-scale way of thinking about development, in which they would fine-tune the choice of technology (like a particular variety of seed or cultivation technique) for specific areas. This fine-tuning made it more necessary than ever to interact with farmers, who could teach extension specialists about local conditions, practices, and preferences. The *proefvelden* became a site of two-way communication, not the unidirectional outreach that planners had imagined, and farmers and experts came increasingly to be collaborators on the project of development.

Farmers seemed to respond with great interest to variety trials and demonstrations, even when they were reluctant to change their practices in the ways the Department suggested (*Verslag Landbouwvoorlichtingsdienst* 1912: 67-81, 94-108; *Verslag Landbouwvoorlichtingsdienst* 1913: 92-104). While showing up for demonstrations or lectures certainly suggested curiosity, participating in the trials themselves indicated a more serious interest on the part of farmers, as it required a farm family to invest a significant amount of time and effort to meet the *proefveld*'s stringent protocols. If farmers wanted to work on a trial, they had to agree to be supervised by an extension specialist. They might have to designate a particular place in their fields for

142

BIJLAGE VI.

VARIËTEITENPROEVEN IN KEDOE 1913—'14.

Naam der variëteiten.	Opbrengst per bouw in picols	Leeftijd in dagen bibit	aanplant.
VARIËTEITENPROEF IN DE DESSA TIDAR.			
Pelak	79	58	122
Brondolpoetih	82	"	"
Mamas	78	"	"
Papaharen	79	"	"
Bev. padi Mamas dessa	77	"	"
VARIËTEITENPROEF IN DE DESSA TEGALSARI.			
Srikoening	24	73	132
Sarilaja	29	"	"
Sengkowo	49	"	"
Mamas	47	"	"
Bev. padi Gendjahklepon	49	"	"
VARIËTEITENPROEF IN DE DESSA MENDOET.			
Pelak	43	49	123
Papaharen	57	"	"
Goendilmolok	57	"	"
Srikoening (Bali)	sterk aangetast door walang sangit		
Bev. padi Mentikoerang	50	"	"
VARIËTEITENPROEF IN DE DESSA NGRADJEG.			
Pelak	58	58	133
Papaharen	64	"	"
Goendilmolok	52	"	"
Srikoening (Bali)	55	"	"
Bev. padi Mentikoerang	50	"	"
VARIËTEITENPROEF IN DE DESSA PODOSOKO.			
Srikoening	48	71	124
Goendilmolok	49	"	"
Nongkoblonjoh	48	"	"
Mamas	43	"	"
Bev. padi Antoep	30	"	"

A table of data showing rice yields from a group of villages on Java.
Source: *Jaarverslag van den Landbouwvoorlichtingsdienst* 1914

the tested varieties, separate varieties carefully to prevent hybridization, and perform precise calculations of yields after the harvest. In the case of fertilizer experiments, careful control of the water supply to different parts of the field was essential. While growing rice for trial fields broadly resembled ordinary farming, these special requirements placed an additional burden on farmers and their families. The farmers' willing participation signaled that they found such trials worthwhile.

The Department sweetened the benefits of participation for some farmers by offering special incentives. For example, extension specialists distributed eighty picols[7] of the rice variety *Oeproek* to farmers for the 1913/1914 growing season. The Department loaned seed to farmers, who were required to return one and a half picols of rice for every picol they borrowed within three weeks of harvest. The returned rice had to be well cared for, and the same quality and variety as that distributed. In general, reported J. E. van der Stok, people cooperated well and did not abuse the system (*Verslag Landbouwvoorlichtingsdienst* 1914: 245-247). Officials sometimes permitted farmers to take out small loans in cash, returning a set quantity of rice for every guilder borrowed, but they screened these farmers carefully, accepting only those who had references from the local bank or who were seen as otherwise trustworthy due to their previous participation in trials or loan plans (*Verslag Landbouwvoorlichtingsdienst* 1914: 248). Farmers might also help the Department multiply a useful variety of seed. At Simowahoe in 1914, extension specialists decided they did not have enough of the *padi baok* seed to distribute as broadly as they wished, so instead, they made a smaller amount available only to village heads (presumably for some cost, but this wasn't specified), and those growing the *baok* had to submit to supervision during the growing season and harvest. The Department distributed *padi baok* to 109 villages and bought the harvest back at *f*4.50/picol, a respectable price (*Verslag Landbouwvoorlichtingsdienst* 1914: 257).

Getting farmers to produce purified seed themselves was a critical aspect of the Department's long-term plan to make line-selected seed a viable development technology in the Indies. In 1914, two years after establishing the seed gardens at Ngandjoek and Simowahoe, J. E. van der Stok noted that the gardens alone would not be able to produce enough seed for the regions they served (Van der Stok 1914a). Van der Stok estimated that Ngandjoek could produce no more than 500 of the estimated 10,000 picols of seed needed if they were to supply all the seed for the region (Van der Stok 1914b appendix 1:1). Leaving seed generation to ordinary farmers without some kind of incentive would not do, however; farmers needed a reason to tend these stands of rice separately and to watch carefully that the populations of seed remained pure. Van der Stok suggested that farmers in the regions around the seed garden be paid a premium price for pure seed.[8] Over the long term, he suggested that such a practice might encourage the start of private businesses to multiply seed, taking the burden from the colonial government. In the meantime, he noted that the Assistant Resident and Regent of Berbek (near Ngandjoek) had both agreed to help put the seed-buying plan into place (Van der Stok 1914b: 3). One difficulty

of the system, however, was price. The Buitenzorg garden had sold seed primarily to private European rice growers, who grew rice for export to Europe on lands they had managed to maintain ownership of, even after the agrarian reforms of the 1870s. These growers multiplied their own seed and distributed it to their tenants. Because they grew for the export market, they could pay higher prices and earn more for their crops than could indigenous farmers (Van der Stok 1914b: 2). The other seed gardens could not charge such high prices because indigenous farmers did not have the resources to buy expensive seed. Van der Stok argued that pure seed prices had to be approximately the same price as ordinary varieties. Having indigenous farmers multiply seed themselves, rather than producing it in relatively expensive government-operated facilities, was the more practical solution.

While farmers' labor and land was clearly crucial to the Department's efforts to make line-selected varieties a viable development technology, farmers themselves began to influence the thinking of extension specialists about what constituted a desirable variety of rice, a seemingly small influence that in fact would shape the meaning and practice of development in significant ways. Treub had assumed that if the Department produced a higher-yielding variety that required no additional work, people would simply accept it. Lovink believed that adding education to the mix would produce the necessary cooperation. Neither had counted on farmers providing active feedback about the qualities they looked for in rice, and therefore inserting their own ideas about improving agriculture into the development process.

The first hint that simplistic education or demonstrations would not suffice to change farming practices became clear in the farmers' response to the variety trial and seed-multiplication projects mentioned above. Scholars have frequently pointed out that differences in the priorities of farmers and that of governments create a chasm that development or extension work cannot always bridge, and the Indies was no exception (Lipton and Longhurst 1989). For example, in 1911, farmers in the district of Wonosobo were more than willing to grow Carolina rice for the extension service, but they asked to be paid in native rice for the harvest they brought in (*Jaarverslag van het Departement van Landbouw, Nijverheid en Handel* 1911: 86). In such cases, farmers treated the extension service's offers more as a new sort of trade transaction than as a demonstration of long-term change to their traditional rice growing, trade, and consumption. Farmers might enthusiastically support field tests without interpreting them as persuasive demonstrations of desirable new varieties.

This is not to suggest that farmers misunderstood what the trials were meant to accomplish. The annual reports from the Madiun/Kediri district in 1912 and 1913 reported numerous trials that indigenous farmers (presumably village heads) requested and financed themselves with the Department's technical help (*Verslag Landbouwvoorlichtingsdienst* 1912: 98-99; *Verslag Landbouwvoorlichtingsdienst* 1913: 185-186). These included variety trials, fertilizer trials, demonstrations of dry nurseries and row planting, and in 1912, an effort at variety selection. This suggests that indigenous farmers clearly understood that trials could demonstrate new

techniques or materials. Nevertheless, their acceptance of variety trials, a technique of development, should not be confused with an acceptance of the specific goals or ideals of development. Farmers and extension workers often disagreed in their respective evaluations of the usefulness of a particular rice variety.

The Department had imagined development would proceed through increased yields, which would improve the food supply and farmers' economic situation. Farmers, in contrast, did not necessarily consider yield their top priority. Those who sold rice in domestic markets had a more sophisticated view of their own economic situation than most welfare planners seem to have had, at least in the 1910s. Aside from choosing varieties that responded well to local water, soil, and climate conditions, the people of Java were strongly committed to certain qualities in rice, and those qualities would fetch a good price. Extension specialists from many different districts on Java remarked that farmers appreciated the "beautiful grains" (*mooie korrels*) of certain rices. Plump, oblong, white grains would bring a much higher price than inferior grains from a variety that produced more. Farmers might sometimes choose to plant a long-ripening variety, which were often high-quality, well-flavored rices that brought a high price. Other times, they might choose a lower-quality, earlier-ripening variety that would enable them to put rice on the market during *paceklik*, the lean times that preceded the bulk of the rice harvest, and thus cash in on a hungry market. If a rice crop failed, farmers might choose to plant a dry-season variety of rice, usually of low quality, to compensate for their losses (often displacing conventional dry season crops like vegetables). Such complex decision-making did not fit easily into the Department's purely yield-oriented strategy.

As they worked more with farmers, extension specialists began to take these considerations into account, attempting to categorize the qualities apart from yield that made for desirable (and therefore adoptable) rice. Van der Stok, for example, reported on the requirements of people in the area of the Sidoarjo. Rice should have plump, white grains, absorb water well on steaming, form a slightly clinging mass once cooked, and have a "pure" flavor (*Verslag Landbouwvoorlichtingsdienst* 1913: 10). Extension specialists expanded their techniques away from simple education and included more opportunities to gather detailed feedback from farmers on tested varieties. They implemented taste tests and evaluations of the seed's visual appeal. At the Sidoarjo garden, for example, extension specialists invited their indigenous personnel, local farmers, and dignitaries to a party at which they sampled different varieties of rice, accompanied by many side dishes, as well as entertainment, to complete the festive atmosphere of a secular *selamatan,* or ceremonial gathering.[9] The extension service used this feedback to determine which varieties would be chosen for selection at the seed gardens, thereby materializing farmers' opinions in the form of purified varieties of rice. In 1914, Van der Stok argued that the highest-producing rice variety in the area of the Simowahoe, Wriji, was not the best candidate for line selection because of the flavor and the ripe grains' tendency to drop before harvest. Instead, he recommended baok, which had a slightly lower yield, but better met the

requirements of the people in the area (Van der Stok 1914a appendix 3: 8). Baok could therefore be made into a development technology, while Wriji was questionable. Using such criteria for determining the developing potential of a technology departed significantly from Lovink's (and Treub's) assumptions that yield and the amount of extra work involved in adopting new varieties were the only criteria that mattered.

Similarly, extension specialists began to appreciate the complexity of the economic decisions that farmers were already making and came to the conclusion that higher-yielding varieties did not always produce much in the way of economic improvement. In Cheribon in 1914, W. de Wijs, the district's agricultural advisor, concluded that early-ripening rices brought a low enough price that even with a greater yield than late-ripening rices, it was not financially worthwhile for indigenous farmers to change (*Verslag Landbouwvoorlichtingsdienst* 1914: 57). Van der Stok hinted at the growing concern about quality vs. quantity when he tempered the Department's development goals in a 1914 report:

> Temporarily, the evaluation of varieties shall have to be chiefly aimed at the increase of *rice production* without however allowing the quality of the product to differ too much from what the people are accustomed to in this respect. (*Verslag Landbouwvoorlichtingsdienst* 1914: 253)

A case that shows how powerfully the goals of the Department and those of indigenous farmers could conflict is that of a variety much championed by the Department called Skrivimankotti. This variety originated in the Dutch colony of Surinam where it had been highly productive and popular. Agricultural experts eagerly tested Skrivimankotti in trials across Java, hoping to duplicate the success experienced in Surinam. According to the Department's goals, Skrivimankotti performed brilliantly. It often (if not always) out-produced local varieties and was notably resistant to disease and insect infestations. If the insects and bacteria were not overly fond of Skrivimankotti, however, neither were the Javanese people, who complained that the grains dropped too easily from the panicle during harvest, and that the cooked rice had an unappealing flavor. Dutch experts tried repeatedly, in many areas on Java, to introduce Skrivimankotti (even giving it the more appealing, "local" name *padi bogor*), but did not succeed in making it a popular variety on Java.[10] The Dutch extension specialists clung stubbornly to their conviction that Skrivimankottti had a place on Java, but time and again, farmers found it unappealing, despite its hardiness and yield.

The failure of varieties like Skrivimankotti did not cause the Department to abandon the goal of introducing better-yielding rice varieties, nor did officials lose their conviction that the best way to improve rice agriculture was to find more productive varieties of rice. Extension workers instead subtly began to modify their interpretations of productivity, a modification that took place less in the realm of policy or rhetoric than in practice. They began to recommend varieties that both produced well and received consistently good responses from farmers as the

best candidates for line selection. This led to popular varieties like *Brondol Poetih* being purified and becoming available to indigenous farmers through the government seed gardens. Unpopular varieties like Skrivimankotti were not abandoned, however. For these, the Department sought to make the diversity of Java work in their favor, looking for areas where impoverished circumstances or different opinions and tastes might open up a place for them.[11] In practice, the farmers' feedback made experts more committed to matching rice varieties to local conditions and desires, and much less committed to obtaining dramatically higher yields.

Despite the modification of development goals in practice, the ideal of increased productivity remained firmly entrenched in the rhetoric of development espoused by senior members of the Department. J. Koningsberger, when acting as the Department's temporary director in late 1916, confidently stated:

> It is therefore sufficiently established, that the Native, as soon as the higher productivity of a seed variety is demonstrated, is easily converted to the use of that seed. (*Jaarboek van het Departement van Landbouw, Nijverheid en Handel*, 1916: ix)

Any experienced extension specialist would have recognized the falsehood in Koningsberger's claim. Farmers did not accept higher-yielding seed uncritically. The standard by which extension specialists could view a selected variety of rice as "developing" had been influenced by the farmers' participation in the *proefvelden*. A variety needed more than just a high yield to be accepted as a development technology. Ironically, the compromises that extension specialists made to have selected varieties work as development technologies in the field (for example, choosing varieties that stood a chance of being adopted), may have contributed to making selected varieties seem to be less desirable development technologies in the eyes of high-level planners. Because the varieties that farmers would adopt were not always characterized by the highest yield, even in places where these varieties found a home, the dramatic increases in yield that the Department defined as development did not consistently materialize. Bringing farmers into the practice of extension was relatively easy, but getting them to produce the development the government wanted, was not.

The farmers' influence was subtle, but should not be underestimated. Treub's simplistic notion – that farmers would blindly accept any seeds, provided that there was no more work involved – did not survive the extension specialists' encounters with farmers, nor did Lovink's slightly more sophisticated belief in the persuasive power of education. Instead, extension specialists and farmers collaborated to find varieties that would suit both the government's development goals and the farmers' less single-minded ideas about what would improve agriculture for them. As a result, farmers' responses to, and input on, variety trials cast serious doubt on the ideas that simply improving rice yields would produce higher incomes and that selected varieties would provide a simple path to development. Finally, as extension specialists confronted

the diversity of farmers' opinions, they became increasingly convinced that small-scale development projects, tailored to local ecological and social conditions, were the only ones that had any chance of surviving long enough to produce development.

Conclusion

Ethical thinkers backed Lovink because of his commitment to close contact through outreach and education, and Lovink's legacy was the success of his extension service, which transformed Ethical idealism into a day-to-day reality. Extension efforts brought new technologies and techniques to rural Java, spread the idea of development beyond elite, urban audiences, and established an ongoing, if not always easy, relationship between government representatives and (at least some) indigenous farmers. Indeed, given farmers' mixed responses to selected varieties, one could argue that Lovink was more successful at creating close contact than at producing the increased standards of living that he and other high-level officials saw as the primary goal of development. A close look at the practice of development on the ground explains this odd combination of success and failure. Both Lovink and his backers assumed that knowledge would tend to flow from government experts to the indigenous people. They did not anticipate how much true collaboration would be needed to make development a pragmatic reality, a shortsightedness shared by many colonial and post-colonial development planners (Escobar 1994; Gupta 1998). However, Lovink's network of mediators, farmers, seed gardens, and *proefvelden* created a practice of development that differed dramatically from the plan, producing dialogue rather than unidirectional education. In the case of selected varieties, this dialogue modified in practice the department's policy of increasing yields at all costs, in favor of identifying and promoting varieties that had qualities farmers themselves found useful.

The consequences went beyond the success or failure of one particular development technology, however, because the increasingly experimental practices of development in the field and the collaboration between experts and farmers together produced a growing, and ultimately enduring commitment to small-scale, locally sensitive development in the East Indies. Their work showed that development could happen on the grand scale of the Indies only by putting together a patchwork of small-scale projects attuned to highly variable ecological and social environments. Rather than arrogantly trying to bend the world to their technology, as was common in high-modernist projects, the interaction of Ethical thinking, scientific observation, and farmers' input increasingly convinced experts and administrators that shaping their technology to suit the colony's natural and social world was the wiser course.

This chapter has focused on the "better seeds" story because it represented one of the Department's most widespread efforts for development through agricultural improvement. Similar stories could be told about other projects that took place simultaneously, including

the use of dry nurseries for rice, the choice of crop-rotation schemes, and the introduction of new secondary crops (like vegetables and fruits), to name a few that are reported in agricultural extension service publications. Dutch scientists, it should be said, were certainly not the first to notice the significance of ecological variability for agricultural projects, and in other colonies, scientists used this knowledge to campaign against large-scale, ecologically insensitive technical change (Tilley 2003). Nevertheless, the Dutch case is remarkable for the political potency that the small-scale approach enjoyed. It was not just the experts, but eventually the most highly placed representatives of the colonial state themselves who embraced, and even fought for, the small-scale approach to development. Even as new colonial administrators would challenge the small farmer ideal in the coming years, the small-scale approach would endure as both the political and technical gold standard for development in the Indies.

4

Challenging the Small-Farmer Ideal: The Sugar Industry and the Controversy over Mechanized Agriculture

The small-farmer ideal, and the small-scale, detail-oriented approach to development that it engendered, remained the prevailing standard among experts at the Department of Agriculture through the end of the 1910s. This ideal did not go unchallenged, however. There were some in the Indies, especially Europeans working in the sugar industry, who questioned the wisdom of the entire Ethical edifice of development. They rejected the idea that indigenous development ought to be so intent on keeping farmers on the land, arguing that continued involvement in smallholder agriculture limited the indigenous people's prospects for development, rather than enhanced them. When J. Sibinga Mulder, an ex-sugar planter, became the Department of Agriculture's director in 1918, he offered the best opportunity that sugar planters had yet had to have their alternative views about development ratified by the government and put into practice. The debates that ensued during Sibinga Mulder's controversial tenure, debates strongly shaped by the high-profile participation of indigenous intellectuals, highlight the political significance of technological scale in development, even among those outside the limited circle of experts engaged in development practice.

Rice and Sugar: Tensions of Colonial Production

The sugar industry's challenge to Ethical assumptions grew out of the peculiar nature of sugar growing on Java, in which sugar planters and indigenous farmers shared land. When the colonial government opened Java to private sugar production in the 1870s, they aimed to protect indigenous farmers by making it impossible for non-Natives to purchase land. While sugar planters could lease land for long terms, often 21 years, they did not receive exclusive use of the land during that period. Instead, sugar planters would have rights to any given parcel of leased land for eighteen months (the time it took to bring a sugar crop to harvest) and would then return the land to the owner for eighteen months, allowing time for two wet-season rice crops and one dry-season crop. By leasing land from several villages, planters could keep some portion of their land in sugar every year.

Sugar planters and the indigenous people had intertwined economic lives. Planters made lease payments to every farmer whose land they used and offered seasonal wage labor as well, especially during planting and harvest. Because the plantations' physical boundaries changed every eighteen months, planters brought in armies of landless laborers to dig irrigation works and otherwise prepare previously subdivided lands for large-scale planting (Knight 1994: 51-76). The plantations also provided other economic opportunities in villages, especially for carters, and the craftspeople who supported them, in the years before automobiles and trucks penetrated the sugar regions (Alexander, Boomgaard and White 1991).

The relationship between indigenous farmers and sugar planters, enforced by the Indies' agrarian laws, was not an easy one. It was not the individual farmers who usually negotiated the leasing arrangements, but the village heads, to whom planters often paid a handsome premium to seal the agreements. Farmers and sympathetic social critics complained that the lease payments made by the sugar planters, as well as wages paid to laborers, were too low. Farmers often resorted to pawnshops and loan sharks to make ends meet during the period that their lands were planted to sugar, a fact Ethical advocates repeatedly cited to justify their fear that villages in sugar regions were becoming increasingly impoverished (Welvaartcommissie: vol. 5a,196-201). Complaints about lease payments and wages were not necessarily new, with similar kinds of problems appearing long before the expansion of the sugar industry in the 1870s (Nagtegaal 1996). Nevertheless, the clear ethnic stratification in the plantations, which were in most cases operated by Europeans, framed the issue of low wages as a European-Native conflict of the sort that caught the Ethical reformers' attention. New developments in technology contributed to the tensions in the sugar regions. Because in any given area some land would be planted to rice and some to sugar, conflicts over water were common and became increasingly so by the turn of the twentieth century, when sugar planters adopted intensive methods of cultivation that required more water. Day-night regulations, which gave sugar planters water during the daytime and rice farmers water at night, did little to ease the tension, putting indigenous farmers in the unenviable situation of having to work in the dark to irrigate their rice.

At times, farmers and others in sugar villages reacted violently to the injustices they perceived in their relationship with sugar planters. While colonial commentators seemed unwilling to posit a strong, causal connection between the two, tensions in the sugar villages often found an outlet in incidences of cane-burning, in which indigenous peoples set fire to the cane fields, destroying the harvest and forcing a return of the land back to rice farmers. While the sugar regions were by no means rendered entirely dysfunctional by these tensions, from the early-twentieth century, colonial authorities nevertheless saw sugar regions as particularly troublesome. Sugar was such an important crop that few would advocate eliminating it altogether. Instead, colonial officials sought ways to harmonize sugar and rice production.

The *Investigations into the Declining Welfare of the Native Peoples* devoted a considerable amount of text to studies of the sugar villages (*Welvaartcommissie* 1904). Despite concluding

Sugar cane (left) and rice (right) were usually grown in close proximity in the sugar regions, producing competition for water resources. Source: Collection of the KITLV, Leiden, The Netherlands, 18283

that, on balance, the sugar industry was a boon to the indigenous people, the authors of the Investigations nevertheless sharply criticized the industry for its low wages and inadequate lease payments. The most severe critics also compared the static lease payments and wage rates with the increasing profits of the sugar industry. Some critics argued that these profits came from the growing exploitation of both laborers and water resources, while sugar industry insiders attributed them to improvements in the technology of sugar growing. Whatever the reason, the sugar industry had gained greater benefit from the land they leased, while farmers seemed to be ever more impoverished (Van Kol 1908: 1051-1052). Some Ethical advocates cited the farmers' necessary use of pawnshops and loan sharks as not only an economic problem, but also a moral one. While critics certainly blamed farmers for being profligate and lazy in most accounts,

the sugar industry took its share of criticism as well. Some, like H. H. van Kol, argued for a return to government-owned sugar production, but with a greater emphasis on the indigenous farmers' welfare rather than the sugar industry's profits (Brooshooft 1977: 71-72). While it is not clear that there was much backing in the colony for such a drastic move, advocates for the sugar industry nevertheless rallied to defend their practices and privileges. In the process, they did more than defend the sugar industry. They also challenged the development thinking that informed the Ethical policies and offered a different view of what a "developed" Native should be.

Challenging the Small-Farmer Ideal: The View from the Sugar Industry

Advocates for the sugar industry's viewpoint frequently drew attention to the industry's economic advantages for the indigenous people, with opportunities for wage labor and lease payments being the most important. Some ran the numbers, comparing the economic gain to be had from rice crops vs. wage and lease payments, and pointed out the myriad ways that the sugar industry provided employment for the landless. This last issue was a particularly important one, as few Ethical thinkers had alternative solutions to the employment problem beyond expensive and impractical transmigration projects. Sugar planters also liked to point out how eager farmers were to lease their land, suggesting that the farmers must have found it beneficial (s'Jacob 1903: 15). Here they took advantage of the colonial willingness to ignore the hierarchies in rural society, neglecting to mention that plantation operators rarely negotiated with individual farmers, but with village heads. The extra compensation offered to these powerful members of rural society gave them more reason than the average farmer to be happy about dealing with the sugar companies. Without understanding more about the sugar villages' political workings, it is hard to say whether in actuality ordinary farmers shared the village heads' enthusiasm.

While these arguments defended the sugar industry's actions from a short-term perspective, a few commentators attempted to develop a longer-term view of the sugar industry's advantages for indigenous society on Java. In the process, they offered a different way of imagining development. One prominent sugar industry advocate, Eduard Herman s'Jacob, argued that the Ethical emphasis on improving the yields of small farmers was misguided. Small-scale farming, in his view, was simply too risky to ever be a sound basis for long-term prosperity. For s'Jacob, even the most-skilled farmers on smallholdings were "the playthings of fate," constantly subject to the vagaries of weather, disease, and insects (s'Jacob 1903: 7-11). Unlike a motivated artisan who could grow a business simply by taking up his tools and working harder, the hardest-working small farmer could never adequately control his main tool, his land. Wage labor, especially skilled labor in which the pay was proportional to the effort, offered greater security and would

educate indigenous people to the positive connections between hard work and individual prosperity. This latter point he considered as fundamental to the basis of Western economic life and central to the indigenous people's development. Protectionism, whether from the government or from the communal tendencies of some villages, would be pernicious to this aspect of development, in his view. Long-term development would therefore come more readily from the growth of wage labor, such as that provided to rural areas by sugar plantations, rather than changes to smallholder farming (s'Jacob 1903: 23).

S'Jacob argued that plantations offered a unique and vital bridge between the "parasitical" economic environment of villages, in which people did only what was necessary, to his idealized view of the work-seeking modes of economic life in the West (s'Jacob 1905: 321-323). He even went so far as to suggest that indigenous farmers who were inclined to agriculture would be better served by growing sugar cane, rather than rice, an idea of questionable popularity with other sugar planters (s'Jacob 1905: 321). In the context of s'Jacob's arguments about development, however, it was not a terribly surprising conclusion. If rice farming was so unremunerative, especially given the risks of agriculture, it was better for indigenous farmers to grow crops that offered higher rewards for their risks.

S'Jacob also took on the critique that sugar production deprived farmers of their land indirectly, through the economic difficulties brought about by low lease payments. S'Jacob denied that most farmers actually wanted to farm, rejected notions of farming as spiritually important, and insisted that most farmers simply wanted to earn their daily rice as best they could. They were, in a sense, farmers against their will (s'Jacob 1903: 11). The sugar industry offered a lower-risk way to accomplish the same thing. He thus insisted that farmers would readily take the opportunity to become laborers, given the chance.

This last argument of s'Jacob's, while transparently self-serving, was nevertheless predicated on a serious question. What did indigenous farmers really want? In stratified colonial society, this question was difficult for Europeans to answer, even on those rare occasions when it occurred to them to ask the farmers themselves. Sugar advocates constantly questioned the ability of government agencies, whether the *Binnenlands Bestuur* or the Department of Agriculture, to correctly interpret villagers' responses to questions about their welfare. While the commission that produced the *Investigations into the Declining Welfare* had indeed posed questions to peasants in the main sugar regions of Java, critics argued that the results were entirely compromised by questionable data. Briefly put, outsiders would never get sound information because indigenous informants from within the villages would only tell them what they wanted to hear. Ignoring the very real likelihood that villagers also told the "bosses" only what they wanted to hear, s'Jacob attempted to position the permanent staffs of managers and sugar plantation overseers as the more authoritative sources of information about what the indigenous people wanted. By Ethical definitions, the whole project of development had come to rely largely on

establishing contact and understanding between Europeans and the indigenous people. S'Jacob called into question the ability of any government agency, whether the *Binnenlands Bestuur* or the Department of Agriculture, to establish contact that would produce reliable results.

It goes without saying that s'Jacob and others had an agenda that was tied more closely to securing the long-standing status quo in the sugar regions (and perhaps even expanding their influence a bit) than to a sincere concern about the development of the indigenous people. (Sugar planters argued that the government likewise had a financial agenda, pointing to the official desire to collect more taxes from farmers.) In the environment of the early Ethical period, sugar planters certainly would have found it threatening to be constantly cast in the role of obstructers of a popular political goal. Therefore, they found ways to participate in development projects, using them both for public relations and to try to shape development into something more in harmony with their own goals. When the Department of Agriculture deployed demonstrations across the sugar regions, plantations sometimes participated, at least in the early part of the 1910s, especially in rice-variety selection projects. Sugar planters tried to encourage the adoption of faster-ripening varieties, which would free up the land sooner at the end of the 18-month rotation, making it possible to plant cane earlier or devote more time to land preparation. While planter participation, in terms of land and money, was certainly an advantage for an understaffed and lightly funded Department, the conflict between the Department's ideals about development and that of sugar planters produced problems. Extension workers complained that sugar planters hindered development, especially when they pushed the faster-ripening varieties, which often fetched low prices. Eventually the Department rejected cooperative demonstrations, maintaining their sole authority to interpret the indigenous people's desires for the government and to define development in the Indies (*Verslag Landbouwvoorlichtingsdienst* 1914: 57).

Sibinga Mulder and the Food Question

While the sugar planters had no success in getting their views of development into the Department of Agriculture through the back door, they gained an opportunity to walk through the front door on the coat tails of J. Sibinga Mulder, a former sugar planter appointed to head the Department of Agriculture in 1916. Sibinga Mulder's approach to many problems, particularly the serious food crisis that arose as a result of World War I, reflected sugar industry opinions about the problems of small farming. He would attempt to bring a new way of thinking about development to the Department of Agriculture, one with large-scale, high-modernist sensibilities. The response to Sibinga Mulder's projects would show the tenacity with which social critics, both indigenous and Dutch, held to the appropriateness of the small-scale approach to technological change for the Indies.

When Sibinga Mulder was appointed to replace Herman Lovink as the head of the Department of Agriculture, Industry, and Trade, the issue that would inform thinking about rice, sugar, and development for the next several years was the difficulty of importing food, especially rice, as a consequence of World War I. The Indies had imported a substantial amount of rice every year from British Burma and French Indochina since before the turn of the twentieth century. Both of these key suppliers limited or eliminated exports during the war. Interrupted shipping made the situation even more precarious. Throughout the war, the colonial government faced regional rice shortages, made more severe for the poor by speculation that inflated prices. While Sibinga Mulder played down the incidence of hunger on Java, others claimed the problems to be severe. Tjokroaminoto, chairman of Central Sarekat Islam, one of the most important emerging indigenous activist organizations, reported that he had seen peasants selling their children in order to buy food and that others were dying of hunger (*Handelingen van den Volksraad, Buitengewone Zitting* 1919: 33). Even the generally conservative *Indische Gids* reported that in some areas people were eating and paying high prices for food that was no better than cattle fodder ("*Voedselschaarschte in Wonogiri*" 1919: 886).

Sibinga Mulder officially acknowledged a moderate food shortage in early 1919 and instituted regulations to control the food supply, including rice (*Handelingen van den Volksraad, Buitengewone Zitting* 1919: 8-18). Government orders mandated that some indigenous farmers currently planting export crops like tobacco and tea switch to food crops, particularly "alternative" foods (alternative to rice that is), like cassava and corn, that could be grown during the dry season. European analysts saw the food question largely as a rice question, using the term *voedeslvraagstuk*, or food question, almost interchangeably with the term *rijstvraagstuk*, or rice question, and rice farmers were the most affected by the food policies of the shortage years. Many of the emergency measures proposed by Sibinga Mulder instituted controls on rice supplies. The government capped rice prices to discourage speculation (a measure largely circumvented through village-level black markets) and disrupted the ordinary flow of food between residencies by restricting the transport of rice out of areas experiencing the worst shortages. A particularly controversial regulation required all indigenous farmers to sell a certain percentage of their rice harvest to the government at a set price. Extension specialists would then either redistribute the rice to famine areas or store it to be sold later. Plantation operators were not immune from regulation, as the government required that they grow a portion of food needed for their laborers on their own or surrounding lands.

While the war provided pressing, but temporary reasons to institute new food policies, many politicians argued that the colony needed to take a longer-term look at the issue of food security. In February 1919, the *Volksraad* (People's Council), a newly created body acting in an advisory capacity to the Governor-General, convened a special sitting to discuss the question of the Indies' dependency on other nations for its fundamental food supply. One analyst, C. Lulofs, a member of the Indisch Committee for Scientific Research (*Indisch Comité voor*

Wetenschappelijke Onderzoekingen), presented a statistical sampling of the population and food production and argued that the Indies was likely to continue to be dependent on external food supplies for the foreseeable future (Lulofs 1918). In addition to the increasing population on Java, he noted the increasing scarcity of arable land not already leased to European plantations as a critical factor. With less land available, the growing indigenous population would increasingly be unable to supply their own needs through farming. Indigenous rice cultivation practices supplied only a moderate surplus for sale, which meant that demand would outstrip supply. For Lulofs and supporters of this analysis, the Indies clearly needed to produce more rice domestically. While this had been the goal of the Department of Agriculture's programs for rice improvement since 1905, the lack of dramatic yield increases across Java made many pessimistic about the long-term prospects of the Department's work.

If the population growth on Java convinced many that dependence on rice imports was likely, the structure of labor relations on the sparsely populated Outer Possessions likewise persuaded others, including Sibinga Mulder, that such dependence created a serious risk to the Indies' security. H. J. Grijzen, a former governor of Sumatra, noted in 1921 that the East Coast of Sumatra, an administrative district containing some of the richest estates in the Indies, had imported more rice than the rest of the Indies combined during the war (Grijzen 1921: 154). Grijzen reported that some planters even imported rice from the United States, at more than seven times the ordinary Indies' price to secure a supply (Grijzen 1921: 156). Despite its relatively small population and large land area, the structure of work on Sumatra caused a significant imbalance between the production and consumption of rice. Planters had discovered early that the indigenous people of Sumatra had little interest in working on plantations or producing rice for trade, and estate owners therefore relied almost exclusively on contract laborers from Java and Madura to produce the tobacco, coffee, and the other export crops that made the Indies so attractive to European investors. Unlike laborers from Java's sugar districts, contract laborers owned no land and were obligated to work full-time for the plantation for the length of their three-year contract. Contract laborers had neither the means nor the opportunity to grow rice, and they depended on food supplied by the estate owners as part of their wage. Estate owners had little choice but to rely on imported food.

Food shortages in plantation districts would very likely disturb the already-precarious labor relations between contract laborers and regular estate workers and managers. Contract workers had at times rebelled violently against the working and living conditions described by Ann Stoler as "[c]ramped and poor housing, widespread disease, high adult and infant mortality, along with verbally and physically abusive (and violent) labor relations" (Stoler 1995: 34). Estate owners understood their position with respect to their labor force well enough to wish that rice shortages not be added to this list of grievances. For Javanese and Madurese contract laborers, rice (and not just food) was an irreplaceable part of the contract labor agreement. If plantation owners withheld rice or claimed rice shortages, they risked violent retribution by

already-dissatisfied laborers whose work contracts and social expectations were being violated. In addition to spontaneous rebellion, colonial planters feared that indigenous political activists would systematically spread discontent among workers in an entire district, decreasing the appeal of the Indies plantation districts to outside investors. Clearly, the stability of plantation production and security in the Indies rested to a great extent on a reliable food supply.

Challenging the Technical Organization of Rice Production: The Rice/Sugar Debate

Food security became a topic for wider public debate when it was raised in the new *Volksraad*, an institution that brought together a broader range of political actors in a single, highly public forum than had been possible in the Indies before. Governor-General van Limburg Stirum had instituted the *Volksraad* in late 1917 as a limited experiment in democracy – "limited" because the council had no legislative powers and only half of the members were elected, the rest being appointed by the Governor-General. It was nevertheless a remarkable institution for the Indies because indigenous members (both elected and appointed) were given half the seats and positions equal to their Dutch counterparts, and some were drawn not from the aristocracy, but from important, young political organizations. Never had indigenous leaders held high positions in the colonial government (on the *Raad van Indië*, for example) that were in any sense equivalent to those held by Europeans. Ethical policymakers like Limburg Stirum saw this assembly as a first step towards democratic representation in the Indies and a site for development in a political sense, giving the indigenous people experience in modern political practices.[1] Members represented a wide range of constituencies. For instance, European members J. Gerritzen and D. Birnie spoke up for the private sugar planters, while C. Cramer was both a government servant (Director of the Department of Public Works) and a member of the *Indische Sociaal-Democratisch Partij*, a socialist party much influenced by the Bolshevik revolution in Russia. The Governor-General ensured that prominent indigenous political organizations were represented when he appointed Tjipto Mangoenkoesomo from *Insulinde*, and Tjokroaminoto and Abdoel Moeis from *Sarekat Islam*.

The socialist Cramer put the proposal to the *Volksraad* that the sugar estates be forced to return twenty-five percent of their planted areas to rice farmers on a full-time basis, bringing that land back into food production (*Handelingen van den Volksraad, Buitengewone Zitting* 1919: 201). When Sibinga Mulder addressed the *Volksraad*, he informed the members that the Department was not prepared to consider sugar land cutbacks. If he had hoped to preempt discussion on the question, he did not succeed. After Sibinga Mulder's opening remarks, the discussion immediately turned to the option of restricting sugar production in favor of rice. The debate aligned Sibinga Mulder, the representatives of sugar planters, and a number of cautious

regents against the criticisms of indigenous political activists, socialists, and staunch supporters of Ethical thinking. Of the latter groups, the indigenous political activists from the groups *Sarekat Islam* and *Insulinde* advocated sugar cutbacks most persistently, linking the situation in the sugar regions to the question of development in a way that stood in stark contrast to the formulation of sugar-industry advocates, like s'Jacob.

It was unsurprising that representatives from *Sarekat Islam* (SI) would take such a visible role in this debate. Perhaps the most prominent of the indigenous political groups of the time, SI had organized in 1912 with the aim of fostering mutual help and solidarity among Muslims, and in language influenced by Ethical ideals of the time, to promote indigenous progress toward prosperity and welfare (Shiraishi 1990: 60-64). By 1919, they had approximately 500,000 members. SI had long spoken out about the difficulties of the indigenous people in the sugar regions, and indeed some of their more aggressive activism, like the strikes organized by the young "strike king" Soerjopranoto, had prompted the syndicate of sugar manufacturers in the Indies to request that the group be banned altogether (Kwantes 1975: 26).

Animated by concerns for social justice, indigenous activists had an opportunity to bring their interpretation into what had been a stodgy and predictable debate about food supply in the colonies. They aimed their criticisms not just at sugar planters, but also at the colonial government, including the proponents of Ethical ideals, because Europeans seemed all too willing to dismiss long-term problems in the sugar regions and refused to see the general unhappiness that inspired cane burning. The government's handling of the food shortage added fuel to the fire. When the government collected rice for redistribution, they did not discriminate between those who normally sold rice on the market and those who mainly grew rice for subsistence, pushing subsistence growers into desperate circumstances. Late in 1919 (after the debates over sugar land cutbacks), an incident in the village of Garut escalated to violence when a landowner named Hadji Hasan refused to deliver his rice to the government. He stayed instead in his compound surrounded by family and supporters, chanting prayers. Interpreting this as a threat, the colonial police, on the order of the Assistant Resident, shot and killed everyone in the house. Hadji Hasan was later found to be a member of a secret organization within SI called *Bagian Doea* (usually known as *Afdeeling* B, Section B) with communist ideals and an anti-colonial agenda. Many Europeans interpreted this as clear evidence that indigenous activists had become too independent of Dutch control and represented a threat to colonial order (Shiraishi 1990: 113-114). Even before the Garut incident, however, as in the case of the sugar land cutbacks, activists had become bold enough to speak out on social justice issues. Although they espoused positions not very different from those of Ethical thinkers, their willingness to challenge the government made many Europeans uncomfortable. In the *Volksraad* especially, indigenous members used the forum to press their ideals of social justice and push authorities to back Ethical talk with action.

In the discussion over sugar land cutbacks, indigenous members not only criticized the sugar planters and the government; they also rejected European representations of the problem. SI's representative, Abdul Moeis, used Ethical ideals to reformulate the problems in sugar districts, making the proposal to return land to farmers a moral as well as pragmatic issue. He contended that the system of sugar production discouraged farmers, leading to not only poverty and physical hardship, but also moral lassitude. Moeis contrasted this dim picture with a narrative about the virtuous life created through rice production. The idealized Javanese farmer was a devout man, who through his sacrifice, skill, and hard work (and that of his family) produced a bountiful crop of rice, a crop that would feed his family and by extension the rest of nonfarming society. Moeis used his narrative of the virtuous rice farmer (using the Javanese word "*Kromo*") to counter the colonial narrative of the lazy native:

> [. . .] but give Kromo a piece of land, with water nearby, and he will sell his head cloth to buy a *patjol*, and he will by dawn already be seen in his field and after sundown he will return to his hut, not to his opium couch, but to repair his tools. (*Handelingen van den Volksraad, Buitengewone Zitting* 1919: 52)

The ordinary farmer, he argued earlier in his speech, wanted more than anything to grow rice and would become a hard-working and virtuous man if permitted to do so. Only when this was not possible would he turn to the *balé-balé* (a reclining couch on which one smokes opium) and become degenerate. Moeis differentiated his hardworking *Kromo* from the "lazy native" through the ownership of land and the production of rice, implicitly tying moral virtue to the existing technical organization of smallholder food production on Java. If the colonial state wished to expand its supply of rice, Moeis suggested, it needed only to permit more farmers to exercise their innate, and morally uplifting, desire to farm.

Moeis's narrative formulation linking social virtues with the indigenous system of rice production carried a serious, and for adherents to Ethical thinking, disturbing implication. If the colonial system of sugar production that relied on leased rice lands and inexpensive labor actually promoted degeneracy among the indigenous people, then the colonial influence achieved the opposite of the development called for under Ethical ideals, holding back the indigenous people in a manner sadly reminiscent of the nineteenth-century system that reformers had so criticized. By advocating a position that prioritized rice over sugar, and implicitly, development over stagnation, Moeis challenged the colonial government's commitment to Ethical ideals.

Another, more radical representative of the diverse group of indigenous activists known collectively as the *pergerakan*, or "the movement," joined Moeis in his challenge. Tjipto Mangoenkoesomo, a distinguished doctor, fiery orator, and leader of the *Insulinde* party, took up the theme of colonial domination in the sugar districts, characteristically criticizing the government in a way that encouraged outright, active resistance to colonial authority (Shiraishi 1990:

117-127). Tjipto highlighted the injustice of the simultaneous existence of indigenous poverty in the sugar districts and high profits on the strong sugar market: "People allow the profit-hunger in Europe to take precedence over the satisfaction of our physical-hunger" (*Handelingen van den Volksraad Buitengewone Zitting* 1919: 48). He interpreted the strikes on sugar lands and the spontaneous burning of cane fields by indigenous workers as subordinated peasants' protests against the dominant sugar producers:

> I have read advice in the Malay newspaper *Sinar Hindia*, that fire can make bitter sugar much sweeter, which words typify the spirit of the Native world. I don't want to threaten, Mr. Chairman! But we can nevertheless understand Native journalists when they go over to the propagation of sabotage, because indeed, despite all the books on food science, cane juice has for us absolutely no food value. (*Handelingen van den Volksraad Buitengewone Zitting* 1919: 47)

Tjipto repeated the challenge of Abdul Moeis in even balder terms: Would the government be willing to rate the indigenous peoples' starvation as more important than the sugar industry's profits? Would the government back its own commitment to the good of the indigenous people? Indigenous activists, joined by sympathetic European supporters like Cramer, transformed the food supply debate into a forum on the question of social justice. Returning land to rice farmers would satisfy the pragmatic goal of meeting the need for and expanded supply of domestic rice, as well as make a powerful statement that the colonial government was willing to back its Ethical ideals even at the risk of displeasing the powerful sugar lobby.

Sugar producers would not abandon their position without a fight, however. The proposal to cut back sugar land threatened more than short-term sugar profits. A precedent to put land back to rice agriculture alone could conceivably be called upon repeatedly to distribute resources away from sugar planters, especially if the food supply continued to be a problem, as many suggested it would be. Supporters of the sugar industry in the *Volksraad*, like J. Gerritzen, the Director of the Java Bank (*Javasche Bank*), and D. Birnie, a member of the General Syndicate of Sugar Manufacturers (*Algemeen Syndicaat van Suikerfabriekanten*), responded to the call for sugar cutbacks with both pragmatic and philosophical objections. Pragmatically, they denied that sugar land cutbacks would noticeably improve the local rice supply, especially because farmers might not have the water, seed, and tools they needed to work the newly returned land successfully. From the point of view of the Indies government, which was itself experiencing considerable financial difficulties, smaller sugar harvests would reduce revenues and discourage all-important foreign investments. Philosophically, they countered Moeis's narrative with the symbiotic interpretation familiar from earlier commentators like s'Jacob, which emphasized the benefits of employment, the cash economy, and the security of wage labor brought about by the sugar industry (*Handelingen van den Volksraad Buitengewone Zitting* 1919: 23-25, 40-41).

Despite indigenous activists' efforts, the *Volksraad* as a whole voted against sugar cutbacks, and Sibinga Mulder cited the pragmatic reasons given by sugar producers as his justification for abandoning the proposal (*Handelingen van den Volksraad Buitengewone Zitting* 1919: 249). Yet the social justice issues would not go away. When Sibinga Mulder introduced an alternate plan for increasing rice supplies, one based on large-scale, European-operated, mechanized rice farming in the Outer Possessions, he would find that the connections that critics made between social justice and rice farming on Java could not be so easily dismissed.

Relocating Rice Production: Mechanized Agriculture in the Outer Possessions

In January 1919, the month before the *Volksraad* met, Sibinga Mulder proposed in a memo to Governor-General van Limburg Stirum that the Indies consider experimenting with European-owned, mechanized rice production as a solution to the food supply problem (Sibinga Mulder 1919). According to this plan, mechanized rice farming would relocate the geographical center of rice production away from Java to the lightly populated Outer Possessions and shift the responsibility of producing the domestic food supply away from the indigenous people to European estate operators. By redirecting attention away from Java, Sibinga Mulder also moved the focus away from the contentious proposal for sugar land cutbacks. He argued the case for mechanization by taking a rather different approach to the question of productivity than had his predecessors in the Department of Agriculture.

Sibinga Mulder argued that the real need in the Indies was not increased rice yields per hectare, as the Department had emphasized in its work to improve indigenous prosperity, but increased yields per worker. By replacing buffalo with tractors to pull plows and disk harrows, and using combines to replace the armies of female laborers who usually harvested rice crops, mechanized agriculture would achieve what indigenous agriculture as normally practiced could never do: create a large surplus per worker. The smaller manual labor requirements of mechanized farms would prevent workers from literally "eating up" the increases in rice production. With mechanical production of a large surplus, there would be no need to improve the per-hectare yields of ordinary farmers. While Sibinga Mulder never said so, one could speculate that he might have recognized that bringing a small number of European planters in step with government goals would be a far easier task than trying to persuade millions of quietly tenacious, indigenous farmers to change their ways.

Sibinga Mulder's plan departed significantly from previous rice projects because it had absolutely nothing to do with Native development. He did not worry about how to make this technology available to indigenous farmers because he planned this as a European operation. The only participation by the indigenous people would be as part of the small labor force these plantations would require.[2] A successful, mechanized rice industry in the Indies promised many

advantages for the colony from the government's point of view. A sure domestic food supply, independent of the whims of rice exporters in Rangoon and Saigon, should increase investor interest in all kinds of estate agriculture (including rubber, coffee and tea) in the Outer Possessions. Since production was to be heavily mechanized, rice estates would not draw workers away from traditional plantations that relied extensively on contract labor. This was a colonial Liberal's dream solution: Solve the food problem with private enterprise and boost investment in export agriculture simultaneously. Indigenous rice farmers would diminish in importance, as they would no longer be essential either to the success of estate agriculture or to the feeding of Java's multiplying population. And not incidentally, indigenous political activists and farmers would lose what leverage the food supply crisis had given them.

Unlike the painstaking, area-by-area improvement work that had come into favor among the Department's extension workers, Sibinga Mulder's plan for mechanized agriculture bore all the hallmarks of high modernism. Mechanized farming would operate on a very large scale, using the latest technologies, which planners assumed had the power to produce dramatic results. Sibinga Mulder's plan was by no means unique, as it followed an ideology of mechanization in agriculture that had become popular among experts in the United States and Europe. Supporters portrayed the thoroughly mechanized farm as the most rational and productive type of farm because it minimized human labor.[3] Sibinga Mulder's specific inspiration, however, came from the California rice industry's expansion in the early-twentieth century. He enthusiastically described the success of mechanized rice farming in California in his memo to Van Limburg Stirum, citing descriptions and statistics given to him by an F. M. Ray, a contact from San Francisco who had provided Sibinga Mulder the opportunity to see a mechanized rice farm in action.[4]

The California experience offered not just a method of agriculture, but also dramatic results that would have made a serious impression on Sibinga Mulder. The U.S. Department of Agriculture (USDA) started rice variety experiments in Biggs, California in 1909, at a time when there was no rice agriculture to speak of in California. The USDA had enough success over the next three years to establish the Biggs Rice Field Station in 1912, with the help of area ranchers (Woodruff 1915; Chambliss 1920). Agricultural scientists and engineers at the experiment station tested different rice varieties and the use of mechanical equipment in rice cultivation. They relied heavily on mechanical land preparation, using tractors to level the land and build levees, and then plow and disk the ground. They used seed drills for planting and eventually combines for harvesting. Gravity-fed irrigation maintained the optimum water levels on the growing crop, but elsewhere commercial growers who adopted mechanized methods of rice growing in California used gasoline-driven pumps for the same purpose. Provided there was adequate water for irrigation, this region of California proved ideal for controlled rice cultivation, as there was little likelihood of excessive rainfall. The method used at Biggs, characterized by working the soil mechanically while dry became known as "dry cultivated rice" (which

should not be confused with the kind of "dry" cultivation of rice done in upland areas, where irrigation is impossible and the rice is entirely dependent on rain). It eventually proved a highly productive method of rice cultivation for temperate regions (Bates 1957).

The experiment at Biggs spearheaded the growth of the California rice industry. In 1910, only about 100 acres in California were planted to rice. By 1918, that number had increased to over 150,000 acres, all privately owned (*The Monthly Bulletin of the State Commission of Horticulture* 1919). While production no doubt gained momentum during World War I, the expansion was nevertheless remarkable. Even more importantly, as Sibinga Mulder noted in his memo, it showed profits even under labor shortage conditions because the mechanized approach enabled rice growers to minimize the number of expensive employees needed to bring in a healthy crop. Sibinga Mulder proposed that the Netherlands Indies attempt to duplicate the California rice industry's success, starting on the island of Sumatra.

In 1919, Sibinga Mulder sent M. B. Smits, an agriculture teacher with the Department, to learn as much as he could about large-scale rice production in the United States. Ostensibly, Smits's goal was to investigate these rice-growing techniques and determine whether such methods might be applicable to the Indies. As Sibinga Mulder had already requested budgetary support for the project, and had other experts scouting locations in Sumatra, it seems likely that the director's mind was already made up. Smits nevertheless needed to learn the details of mechanized rice production, and during his trip, he investigated the kinds of equipment in use and considered what combination of methods and equipment would best serve the Indies. Smits spent most of his time studying the farms in California, although he also visited rice-growing concerns in Louisiana and Texas, for purposes of comparison (Smits 1918, 1920).

Despite the promise of mechanized agriculture, significant differences existed between California and Sumatra, the most likely site for the experiment. The rice region of California was semi-arid, with dry soils that tended to parch and crack in the summer. Sumatra had a tropical climate, and the area chosen was swampy and heavily forested. If Smits was troubled by these differences, he did not find in them sufficient reason to call off the experiment. After spending a year in the United States, Smits returned from California having already ordered equipment for the project, including Holt, Cleveland, and Fordson tractors; John Deere mowers; Brinkman & Niemeyer threshers; and Thomas seed drills. Upon his return in January 1920, Sibinga Mulder put him in charge of the experiment and sent him to the chosen site at the confluence of the Selatdjaran and Aer Moesi rivers north of Palembang in Sumatra. From then on, the work was generally referred to as the Selatdjaran project.

Following the California system's technical idealism, Smits and his staff gave top priority to mechanizing as many tasks as possible. To highlight the novelty of the experiment, consider the differences between the techniques used on Selatdjaran, as cited in the final report project written by the engineers, and those that an indigenous rice farmer might have used ("Selatdjaran Final Report": 3). In a heavily forested area like Selatdjaran, a farmer would ordinarily

have to start by clearing the land of vegetation as completely as possible. It would normally take a farmer several years to clear a hectare of land, cutting vegetation by hand and allowing the trash to dry for burning during the dry season. With some land cleared, the farmer's family would plant a dry rice crop and continue this for several years until the land was clear enough to consider building irrigation works.

Colonial engineers started land reclamation at Selatdjaran in July 1919, at first clearing just a few hectares of land to start the irrigation works. By 1921, they had managed to clear 156 hectares by using machinery including disk harrows pulled by high-powered tractors and stump-pullers. The clearing process did not go well, and only forty-four hectares of the cleared land was ready for planting. Much of the uprooted vegetation was too wet to burn properly, making good planting preparation impossible. Between this and trouble with the irrigation works, the team planted only a small initial crop in January 1921. Looking back, authors of the project's final report remarked that the mechanized approach to clearing had been misguided ("Selatdjaran Final Report": 51). Land could have been more cheaply and effectively reclaimed if they had allowed the indigenous people of Sumatra to practice unirrigated agriculture on it for a year before starting the experiment.

An indigenous farmer, having completed clearing and establishing irrigation channels, would start to prepare his land for the rice crop using a plow pulled by water buffalo or cattle, if available. At Selatdjaran, engineers planned to use tractors to pull plows and disk harrows to do the same work (over a much larger area, of course). The Sumatran climate made choosing a tractor a difficult task. Sumatra has a long rainy season, and wheeled-tractors (like the Fordson) compressed the wet soil, making it unsuitable for planting. Tread-style tractors alleviated this problem to some degree, but they slipped on the wet fields, and inexpensive, lower-powered models sometimes couldn't even propel themselves on the wet soil, much less pull a disk harrow. Land preparation proceeded slowly and had to be done during the dry season.

Once land was ready for planting, if the indigenous farmer had been cultivating seedlings, the women of the family and sometimes outside laborers would transplant seedlings to the field. Afterward, they would flood the fields for the first weeks of growth. For mechanical rice agriculture, transplanting seedlings was far too labor-intensive, so the project team seeded the field directly using seed drills, which worked well. They chose an especially slow-ripening rice variety (with a seven month growing season) so that all the land preparation and planting at the beginning of the season and harvesting at the end could be done in dry weather to accommodate the heavy machinery on the soil.

During the growing season, indigenous farmers relied on good irrigation and careful tending to ameliorate the frequent problems with pests and weeds. The Selatdjaran project faced these same problems, exacerbated by the recently cleared land and troubled irrigation works. In 1921, they planted their small crop too late and it didn't receive enough water at the end of its growing cycle. Rats and insects infested the insufficiently flooded crop and it was entirely

lost. In late 1921 the planting again started, now on 85 hectares of land. This second crop fared better, but was choked by weeds because the fields had not been thoroughly worked before planting, due in part to the fast reclamation process. The project staff reluctantly hired laborers to pull weeds manually, compromising the mechanized approach, in an effort to prevent the entire crop from failing before they could test their harvesters.

While the project staff would make compromises with manual labor for the short term, their ideological commitment to the minimization of manual labor prevented them from adopting alternative strategies that might have helped. For instance, rather than use tractors on marshy ground, they considered a so-called cable system, in which two engines on cars placed on permanent roadways at the sides of a field pulled a plow attached to a cable running between them. This system had many advantages on wet ground: It did not compress the soil and was not subject to slippage, and permanent roadways protected the fields. The Louisiana sugar beet industry used such a system during the 1910s and 1920s, making this a tested and workable technology (Ellis and Rumely 1911). Selatdjaran engineers rejected this option because they could not harvest rice mechanically with it, and they were unwilling to improve one aspect of mechanization by eliminating another.

Where indigenous farm women and hired laborers would harvest a rice crop plant by plant with an *ani-ani* (rice knife) and then thresh it by hand, Selatdjaran workers used mowers and threshing machines to process their harvest. This worked poorly on the variety of rice they had chosen, with much rice lost during threshing, and the straw from the rice clogging the machines. In 1922, they harvested only 882 picols on the forty-six surviving hectares of planted land, disappointing staff members and the interested public alike. Its yield of only 19 picols/hectare was approximately a quarter of the amount that a well-irrigated *sawah* under indigenous cultivation would produce. The results opened the door to debate between supporters and critics, who disagreed on how to interpret the results of the first stage of the experiment.

When Sibinga Mulder defended the project to his critics, he emphasized its experimental character. Smits and other experts working on the project were only starting to learn which varieties of rice and equipment worked best together, and in general, how best to adapt mechanization to the Indies environment. The Selatdjaran staff saw the poor harvest not so much as proof that the mechanized approach had failed, but as useful data that gave insight into the largely unexplored question of how to use mechanized rice production in the tropics. This kind of defense of Selatdjaran was a reasonable response to those critics who primarily objected to its costs. If the costs would come down after further technical development, these critics could be mollified. But the objections to Selatdjaran were not only about cost. Food security, the direction of development, and the questions of social justice raised originally in connection with the proposal to cut back sugar lands would all figure into the extensive debate about the appropriateness of the mechanized farming for the Indies that took place over the course of the four-year experiment.

Sibinga Mulder argued that despite its difficulties, Selatdjaran was making progress, and in his view would eventually pay off, especially for those investors who would benefit from the knowledge gained by the project staff. He noted that after only two years of work, it was too early to make economic judgments about the project (*Handelingen van den Volksraad* 1922: 688). Admitting some problems with the location in Sumatra, he argued that finding a more suitable location in the Indies (he suggested Borneo) would be no problem (*Handelingen van den Volksraad* 1922: 677).[5] He couched his defense of Selatdjaran in terms of food security, arguing that this was the only way to gain the surpluses the Indies so desperately needed. His critics were skeptical, and did not hesitate to make economic judgments. C. Cramer, in a meeting of the *Volksraad*, argued that Selatdjaran had very expensively failed to demonstrate that it could produce rice at a profit. Adding up the costs of machinery and reclamation and comparing these with the paltry harvest, he concluded that the project could only produce rice in insignificant quantities at a price five or six times higher than the highest war prices.

Yet Cramer didn't limit himself to questioning the project's cost in isolation; he also tied it to the larger political issues of development, arguing that mechanized farming was simply a wrong-headed approach to increasing rice production. By taking up funds that could be better used to help indigenous farmers, it served as a barrier to real progress in development (*Handelingen van den Volksraad* 1922: 654-655). In this way, Cramer, and others who backed him, implied that taking money away from the indigenous people's development was not just unwise; it was unjust, echoing the social justice concerns raised earlier by indigenous activists. Even relatively mild-mannered complaints about decreases in the colonial budget for agricultural extension, as they arose during the Selatdjaran debate, quietly reaffirmed the conviction that development was the proper destination for Department of Agriculture funds. Sibinga Mulder had always promoted Selatdjaran as a demonstration of a new sort of European enterprise for the Indies, thereby separating the question of development, and the good of the indigenous people, from the question of food production. Cramer and others rejected this separation, bringing development squarely back into the discussion. Cramer argued that instead of promoting economically questionable, mechanized rice farming, the government should seek a solution to its food woes that improved indigenous farmers' well-being: "It goes without saying that Native agriculture is more important for this country than ten Selatdjarans" (*Handelingen van den Volksraad* 1922: 651). Cramer offered a different way of measuring the project's success, by shifting the discussion from economic or technical feasibility to its contribution (or more properly, lack thereof) to development.

Cramer offered as an alternative the possibility of Javanese colonization of the Outer Possessions, a controversial idea that stretched back to the earliest days of Ethical planning at the turn of the century (Idenburg 1904). In this plan, landless Javanese would be transported from the densely populated island of Java to Sumatra or other islands, and given irrigated land, tools, livestock, and seed to establish villages and practice rice agriculture. Such farmers could

produce a moderate rice surplus, and not incidentally provide some laborers for nearby plantations.[6] Work by agricultural extension specialists to improve the productivity of indigenous rice agriculture would support the transmigration projects that in the end might provide the self-sufficiency that Sibinga Mulder envisioned. The plan's greatest advantage for its supporters was that it offered economic uplift to the indigenous people, while at the same time showing that European plantations could benefit from the food and labor made available in these prosperous farm communities. Cramer advocated Javanese colonization in place of mechanization, saying: "Not with a technical revolution, but with socio-economic evolution will Indië benefit the most" (*Handelingen van den Volksraad* 1922: 651).

Cramer and others opposed to Selatdjaran successfully changed the terms of the debate, making engagement with development necessary in any defense of the project. When faced with this kind of criticism, Sibinga Mulder could no longer rely on his defense of the project's slow but sure technical progress to quiet objections. He and other advocates addressed the issue of development by resurrecting the views that sugar advocates like s'Jacob had argued for so passionately fifteen years earlier. Supporters of Selatdjaran questioned the Ethical assumption that improving (and continuing) the practice of indigenous rice agriculture would lead to "uplift." Echoing s'Jacob's claim that most indigenous farmers were only rice farmers "against their will," they claimed that Selatdjaran would ultimately benefit indigenous society far more than any preceding project because it would permanently free farmers from the need to grow rice.

Dr. R. Broersma, a supporter of Selatdjaran and a frequent contributor to the agricultural weekly, *Algemeen Landbouw Weekblad*, made the case this way: "The backwardness of native society is rooted in the fact that rice agriculture is practiced almost everywhere, in various ways that will never lead to a major industry and in which many hands are kept busy all too easily" (Broersma 1921). The indigenous people were at such an early stage of development, he argued, because they had been tied to highly labor-intensive rice agriculture that depleted their energies and led to economic stagnation (De Boer 1921). Having more people practice rice agriculture would not only be ineffective in increasing food supplies, it would be pernicious to the development of the indigenous farmer. Mechanizing rice farms, in contrast, would motivate farmers to explore more-profitable crops. Sibinga Mulder pointed out that the indigenous people of Sumatra (to distinguish them from Javanese contract workers) turned away from rice agriculture when imports were secure and grew rubber instead. Why force the indigenous people to grow rice when they could benefit from other kinds of crops more readily? Sibinga Mulder, speaking at this moment for the sugar industry that had largely been shut out of the philosophical direction of agricultural improvement, defined a positive role for mechanization within the larger project of development by trying to redefine it as a process that could and should separate indigenous people from rice growing.

Despite the criticisms of Cramer and others, the Netherlands-Indies government acceded to Sibinga Mulder's requests and maintained Selatdjaran's budget for another year. The growing

season of late 1922 started positively, with the staff fully completing planting before the start of the rainy season. By early 1923, the crop was doing well. In February, however, the workers noted an infestation of *kepi*, an insect that damaged the plants and was difficult to eradicate even by flooding the crop. The *kepi* destroyed most of the harvest. In the meantime, Sibinga Mulder had retired from his position as director of the Department in late 1922 (for health reasons), and with the loss of the harvest and the project's most aggressive champion, the new director, A. A. Rutgers, decided to terminate the experiment at Selatdjaran. Future rice projects would focus solely on indigenous farmers.

The termination of the Selatdjaran project needs to be understood as more than simply economic, although economics certainly played a role. While the official report issued in 1924 cited the project's high cost as reason for its ultimate cancellation, it also noted several technical alternatives they had not yet tried that promised to improve the experiment's economic performance markedly. That the Department of Agriculture was prepared, even in the face of these alternatives, to simply abandon their investment in the project suggests that they had become disenchanted with the whole idea of European-operated, mechanized rice farms. The termination of Selatdjaran was a damning rejection of the high-modernist methods and ways of thinking. With its radical technologies, high costs, and controversial separation of indigenous people from the solution to food questions, Selatdjaran had little hope of ever gaining widespread appeal.

Even after its collapse, critics of the project continued to cite it as an example of the basic social irresponsibility of using government funds for such work when small-farmer-oriented development projects were going wanting. A *Volksraad* member named F. Laoh argued this view in 1923. Adding the amount of money spent on Selatdjaran and a failed mechanical rice mill in Korintji, North Sumatra, he pointed out that the government could have built three agricultural schools. He concluded:

> Then we would have indeed gotten food, Mr. Chairman, not rice but intellectual nourishment, and for this country, I consider that much more beneficial than both the Korintji and Selatdjaran projects, even if these projects had fully answered their expectations. (*Handelingen van den Volksraad* 1923: 315)

For Laoh, and for other critics like Cramer, Selatdjaran could not have succeeded even had it produced the promised abundant harvests because it abdicated the colonial government's responsibility to promote the indigenous people's development. By 1923, the leaders at the Department of Agriculture no longer suggested that domestic rice production be alienated from its traditional producers. They abandoned the "technical revolution" of Sibinga Mulder, focusing instead on the "socio-economic evolution" for which Cramer had argued.

Conclusion

The widespread anxiety about food security during and after World War I, the granting of the Department of Agriculture's directorship to a powerful advocate of the sugar industry, and the experiment at Selatdjaran together provided perhaps the best opportunity the sugar industry ever had to bend the direction of Indies' development projects to their own way of thinking. The sugar industry's take on the problem of development represented an important, but ultimately unsuccessful challenge to the small-farmer ideal. Starting with the debate on sugar land cutbacks, a coalition of indigenous activists and sympathetic European members of the *Volksraad* succeeded in tying the broader notion of social justice for the indigenous people to development for farmers that kept them on the land.

Selatdjaran's historical significance is less in the meager results of the project than in its demonstration of the deep support for the small-scale approach to development, and the difficulties that large-scale projects inevitably faced as a result. Opponents of mechanized agriculture and supporters of sugar land cutbacks alike upheld the indigenous rice producer as both the most morally appropriate producer of rice for the Indies and the rightful recipient of government resources. The Department of Agriculture's attention to small farmers had become more than simply a technical practice of interest only to a small group of experts, but a moral framework that defined the colonial government's obligations. Critics rejected the technological possibilities of Selatdjaran not merely because they thought mechanized rice was expensive, but because the entire approach represented an unjust neglect of the colonial government's central responsibilities.

5

"Here We Live in All Centuries at Once": The Limits of Ethical Idealism

The 1920s saw important challenges to the Ethical policies, from Governor-General Fock's budget-cutting, which gutted many measures during the early years of the decade, to the Communist uprisings in 1926-1927, which put an end to government tolerance of indigenous political and press freedoms. The changes of the 1920s killed off the Ethical policies in the opinion of most scholars, and indeed the government abandoned many of the most ambitious social policies originating in earlier years of the century. As the colonial government abandoned other Ethically motivated projects, technological development continued unabated. But did development projects continue to be informed by Ethical thinking, or did technical experts, like other bureaucrats in the colony, abandon their Ethical commitments?

Scholars have investigated at length a significant shift in development programs that occurred during this period; rejecting the tenets of the small-farmer ideal, the Department turned their attention more and more towards wealthier farmers, who could conceivably take up lucrative, export-oriented production. This "betting on the strong" approach certainly looked like a rejection of the principles that informed Ethical thinking (Wertheim 1980; White and Hüsken 1992). According to this interpretation, the changes of the 1920s signaled a final descent into development as hypocrisy, as the "good of the Native people" increasingly seemed to mean only the good of a very few (Breman 1983). The idealistic vision of improved lives for all seemed to fade, along with Ethical dreams of a new kind of relationship with the indigenous people, to be replaced by connections between experts and elites that echoed nineteenth-century modes of indirect rule. This initial interpretation, however, may be misleading. Upon deeper investigation into the motivations and reasoning behind the changes in development practice, the relationship between technological development and the anti-Ethical reactions of the 1920s are more complicated than they seem and suggest the ongoing importance of certain aspects of Ethical idealism in technological development.

Challenges to Ethical Idealism

The late 1910s and early 1920s saw significant challenges to Ethical thinking, particularly in the political arena. The colonial government responded to growing political radicalism not with compromise or conciliation, but with a harsh crackdown meant to put an end to troublesome activist groups. The government arrested prominent leaders, including Haji Misbach and E. F. E. Douwes Dekker of the Insulinde party, and expanded their policing and intelligence infiltration of political groups in an effort to put a lid on social disturbances (Shiraishi 1990: 117-174). Even those indigenous leaders who had enjoyed some respect from Dutch authorities, such as Abdoel Moeis and Tjipto Mangoenkoesomo, found themselves no longer trusted; Sarekat Islam all but vanished, as many members suddenly were at risk for arrest. Dirk Fock, Governor-General as of 1921, attempted to control political groups through police actions, while simultaneously coping with a tight economy floundering in the post-World War I recession. Budget woes prompted him to both increase taxes on the indigenous people and cut back colonial spending, including the Department of Agriculture's funding (Ricklefs 2002: 174). The Department, then under the unpopular leadership of J. Sibinga Mulder, chose to cut back on agricultural extension, among other areas (*Handelingen van den Volksraad* 1921, 1922). Although a strong supporter of Ethical reforms during the early years of the century, Fock had taken a notably conservative turn by the time he became Governor-General. Advisors had to beg him to reinstitute programs aimed at improving indigenous welfare, even after the economy had started to recover (Wellenstein 1921).

Despite significant budget cuts that made development programs hard to support, and a wider backlash that questioned the wisdom of the Ethical policies in the wake of social unrest, Ethical idealism did not simply vanish during the early years of the twentieth century. Indeed, as discussed in the last chapter, Sibinga Mulder's efforts to shift Indies rice production in a decidedly anti-Ethical direction failed to gain wide support, as his critics forced Sibinga Mulder to defend his Selatdjaran project in terms of how it would improve the welfare of the indigenous people. His critics (many, but not all of whom, were prominent indigenous activists) continued to call for more education, more agricultural extension, and thereby more close contact with the indigenous people, the latter idea forming one of the most significant connections between technological development work and the wider politics of Ethical policy-making. As late as 1920, then Governor-General van Limburg Stirum argued that such contact was essential for colonial society to move past its social problems. If the government stayed in contact with the indigenous people, then the indigenous activists would have a more critical, and less gullible, populace: "Unremittingly and tirelessly must contact with the people be sought, if the purposes of the government are going to be explained" (Van Limburg Stirum 1920). Within the Depart-

ment of Agriculture, Industry, and Trade, experts remained convinced that close contact was essential for the success of development, because indigenous understanding of development goals was a central prerequisite for their willing participation.

Those same experts, however, did engage in important critical debates during the early 1920s that questioned Ethical assumptions about the relationship between technology and prosperity. While certainly less volatile and tragic in their outcomes than the anti-Ethical moves in the political arena, these debates had at their foundation similar phenomena that puzzled Dutch experts. Just as politicians saw indigenous people responding to Ethical social policies in ways the Dutch had never predicted, creating a critical, rather than cooperative population, so too did technical experts find that indigenous farmers engaged with technological development projects in ways that did not produce the prosperous, modernizing, small farmers that Lovink had hoped to create. While in the social arena, the colonial government chose to respond to this unpredictability by exerting greater control over the indigenous people, ruthlessly punishing anyone who seemed to threaten the public order even in the most oblique way, in the world of "native development," experts continued to reject compulsion. Instead they looked to new theories, like J. H. Boeke's dual-economy idea, as well as findings from the burgeoning young field of agricultural economics, to interpret the indigenous people's behavior. Armed with these new perspectives, they aimed to define new practices that would succeed in creating the disciplined farmers development experts wanted through persuasion and the exposure of shared interests.

It is important to understand that neither the dual economy theory nor agricultural economic critiques arose as direct indictments of the failures of the Ethical policies. Agricultural economics was an international field of study, and Boeke's earliest explanation of the dual-economy idea appeared before Ethical technology projects had even been fully established (Boeke 1910). These critiques, however, served as a resource for those seeking to understand the failures of development and the behavior of the indigenous people. They triggered a literal disintegration of Ethical thinking among technical experts, who problematized the connections between technology and prosperity that Ethical thinking had assumed to be clear-cut, yet retained other Ethically founded convictions about the importance of close contact and the value of development work's small-scale focus.

Problems of Development: Technology and Prosperity

The Department of Agriculture's shift from the small-farmer ideal to a method of "betting on the strong," as Wim Wertheim named it, was a crucial change in the 1920s. It may seem that this change needed no more motivation than Fock's budget cuts, which made it increasingly difficult for the Department to work with many individual farmers, and the general political

turn away from the broad social engagement of the Ethical policies. However, this explanation is at best partial, and does not account for important continuities in Ethical thinking within the Department during these years. To truly understand why development policy shifted towards a smaller, wealthier audience, and the relationship of this change to Ethical thinking, it is helpful to examine the technical experts' response to the outcomes of the previous ten years of development via selected varieties, demonstrations, and agricultural education.

Agricultural experts like L. Koch, a plant scientist who had become the head of line-selection research in Buitenzorg, and T. J. Lekkerkerker, the Director of the Agriculture Section of the Department as of 1921, had imagined the connections between technology and prosperity to be straightforward, just as Treub and Lovink had before them. Using the technology of selected varieties, and improved knowledge about modern farming obtained in agricultural schools, farmers would see improved yields for their traditional crops; perhaps introduce new, valuable crops; and thereby gain improved incomes. When enough farmers followed this course, the prosperity of entire regions (stimulated by the demonstration effect of individual success) would rise. By 1920, experts began to see the problems with nearly every aspect of this understanding of how to build prosperity with new agricultural technologies.

One significant problem was the question of how to make purified varieties reliably and repeatedly produce improved yields on Indies farms. While experimenters could always produce predictable and repeatable yields in carefully tended experimental plots, producing that outcome in the real world was a non-trivial problem. In 1918 L. Koch published an article in *Teysmannia*, an agricultural research journal, pointing to the difficulties of getting farmers and purified varieties together to reliably produce improved yields. The requirements of pure seed and the ordinary practices and necessities of indigenous farming mixed poorly. Because farmers did not usually have the resources to buy rice seed year after year, they often planted seed stored in a village rice barn from the previous harvest (*lumbung*). Rice seed from this source would ordinarily "degrade" after several years because it might mix with other varieties or spontaneous hybrids that could arise in any but the most closely tended fields. To keep seed pure, it had to originate from legitimate sources, preferably seed multiplication gardens whose main business was to create pure seed. By the late 1910s, the only sources for seed of guaranteed purity were the government's seed gardens, like those at Ngandjoek, Buitenzorg, and Sidoarjo. If farmers did not get new seed yearly from these sources, purified varieties would, after one or two years, produce no greater yield than the conventional varieties.

In one two-year test in the region of Yogyakarta, the agricultural consultant (the new title for Lovink's *landbouwleerars* as of 1922) estimated that only twenty-three percent of the farmers in any given year would purchase new seed, the rest taking their seed from the village *lumbung* (*Jaarverslag van den Landbouwvoorlichtingsdienst* 1923: 45). In the same region, the reporter noted a case in 1919 in which a village *lurah* (chief) who had arranged with the Department to obtain purified seed for the village, in fact used it only in his own fields, confounding extension

Sketch of a rice barn from the region of Supayang c. 1875.
Source: Collection of the KITLV, Leiden, The Netherlands, 36A-32

efforts to encourage all farmers to plant the new variety (*Jaarverslag van den Landbouwvoorlichtingsdienst* 1920: 103). To make purified varieties produce the expected results in the field would require some effort by the government to either make the seed more affordable, bypassing self-interested *lurahs*, or force farmers to adopt the new varieties, neither of which the Department was willing or able to do. Not only did experts continue to reject the idea of compulsion in agricultural extension, but the colonial government was not prepared to embrace the high cost in personnel and material needed to guarantee purified seed to so many farmers, year in and year out. Purified seed needed an infrastructure of people, institutions, and practices to make it able to produce high yields; neither the Department nor the colonial government more broadly had the will to put that infrastructure in place.

Because the science of line selection still left room to question exactly why purified varieties produced higher yields, Koch also questioned whether purified varieties themselves, independent of the operation of indigenous farms, might be a problem. Koch argued against the basic premise of line selection, that purified lines would assuredly produce a higher yield, and therefore questioned the basis of the "better seeds" philosophy of development (Koch 1918). Citing previous experiments conducted in Buitenzorg and his own research, he claimed (although later researchers would disagree) that when selecting pure lines for increased productivity, only a very few truly succeeded; most varieties lacked stability and after the course of a few years degenerated, producing much less impressive harvests (Koch 1918: 6; Van der Meulen 1941:

943-1029). In addition, Koch worried that purified lines weren't portable. Comparing results from the seed selection gardens at Buitenzorg, Sidoarjo, and Ngandjoek, he claimed that only in rare circumstances would a purified line exhibit the same high yields under differing conditions of geography, soil composition, and water availability. Looking back, Koch condemned the pure-line methodology in Indies rice research in a speech to the Fourth Pacific Science Congress in 1929: "Comparative trials between populations and lines [. . .] made it clear that the method of selection followed until 1915 was useless" (Koch 1929). In other words, pure lines, as they had understood them in 1915, were not pure at all. The pure-line methods, moreover, required several years of work to isolate stable varieties, with any one population often yielding several pure lines. Under the Department's constraints, pure-line research required either much time before truly worthwhile pure varieties could be identified or a very large staff. Officials were reluctant to grant either, especially in the budget-cutting environment of World War I and the early 1920s.

Finally, Koch questioned the suitability of purified lines for Indies farmers, even if indigenous farming transformed enough to make them function as expected. Koch observed that pure lines carried greater risk than seed populations, as insect infestations or diseases were most likely to attack a single variety than multiple varieties. If a farmer planted a mixed population of rice, even a serious infestation might leave at least part of the crop. With pure lines, the result would be a complete loss. The question of risk is one that contemporary development experts have often raised (Richards 1986). That Koch asked it in 1918 suggests a continued commitment to some aspects of the small-farmer ideal, particularly the need to protect the most vulnerable, which stemmed from the Ethical values of earlier years. When he noted that "even in Europe" pure lines did not always offer farmers ample flexibility, he simply underlined the idea that this technology might not be appropriate for the Indies (Koch 1918: 29). Koch felt so strongly about the productive possibility of populations that he experimented with some artificially created populations, using combinations of similar purified varieties (Koch 1918: 96).

Koch's critique pointed to serious flaws in not just the appropriateness of the technology of selected varieties, but the whole system of development with the small-farmer ideal. If selected varieties were risky, then using somewhat mixed populations was the only way to protect the more vulnerable farmers from loss. However, mixed-seed populations would not increase yields dramatically and could not therefore provide marked improvements in prosperity. Even should the Department discount Koch's concern about risk and appropriateness, they still needed to create an infrastructure that would allow purified varieties to truly raise yields. This would include expanding experiment and extension personnel to develop and distribute all the varieties needed across Java's heterogeneous environments, creating multiple, easily accessible seed gardens, and using coercive methods to make sure that farmers abandoned their *lumbungs* and bought purified seed year after year. From the point of view of finance, such a project was

not feasible. Not only was there no money to subsidize rice seed on the needed level; they also lacked the staff. Although the extension service had grown from around thirty-eight employees in 1910 to 108 in 1920, the multifaceted, locally oriented approach to development meant that both they and the experimental staff were already stretched thin and could not take on such a large task.[1] Even leaving aside financial concerns, planners would have to be tremendously naïve to imagine that indigenous farmers would embrace such a dramatic change quickly or completely, given farmers' tendencies to selectively choose which advice they would follow.

While experts did continue to value improvements in rice varieties, they increasingly doubted that small farmers could become more prosperous simply by adopting better seeds. The Department put research into purified lines on the back burner, choosing instead to propagate "varieties" that were actually populations by the definitions of Dutch scientists, including popular and reasonably productive varieties, like *padi tjina and brondol poetih* (*Jaarverslag van den Landbouwvoorlichtingsdienst* 1923: 51). Such work promoted generally cordial relationships between the agricultural extension service and farmers, one goal of Ethical policymaking, but it did not produce prosperity.

In education as well, disillusioned experts found that a network of enthusiastic and highly trained young farmers in villages had never materialized. Lovink's development planning had relied on agricultural education to transform young men into model farmers for their villages: The "sons" would go home and teach the "fathers." In reality, the sons never taught the fathers because the sons rarely returned home. In 1919, agriculture schools had graduated 958 students over the previous fifteen years, and graduation and enrollment rates had generally increased for most of the previous decade (*Jaarboek van het Departement van Landbouw, Nijverheid, en Handel* 1920: 93-95). Graduates, however, usually entered the extension service or took lucrative positions with private plantations. Most never returned to farming. Despite the numbers and the individual success of graduates, Lekkerkerker, as head of the Agriculture division, argued that the schools had failed in their central purpose to create developed farm leaders.

Lekkerkerker identified two problems with the system of agricultural education. First, because of the scarcity of open, arable land on Java and the expense of credit, many young men had trouble finding and purchasing land on which to start farms. Second, there existed such a "development gap" between educated farmers and the villages to which they returned that graduates would become easily frustrated by the community members' old-fashioned expectations and the poorly capitalized realities of life on Javanese farms (*Jaarboek van het Departement van Landbouw, Nijverheid, en Handel* 1920: 93-95). Simply put, graduates fit into life on plantations and in the extension service more readily than that of Javanese villages, because education had changed their social position. Lekkerkerker worried that educated Natives could therefore not really act as the mediators of change in the villages. He argued that schools had

to reform their approach, emphasizing practical farming rather than higher education in theoretical issues. Doing so would produce farmers, rather than graduates with higher expectations (and, although he did not mention it, higher qualifications).

By the early 1920s, experts in the department had no reason to question their Ethical commitment to close contact that had produced an environment in which farmers willingly participated in experiments and trials and generally displayed a strong interest in agricultural change. Likewise, they remained convinced that solutions had to be tailored to the appropriate environments, one of the most important practical outcomes of earlier Ethical beliefs. Yet it was this conviction in part that made selected varieties such an expensive and difficult development technology to implement on anything like the scale needed to produce dramatic yield increases. They had serious reasons, therefore, to question whether these technologies, in combination with the small-farmer ideal, could ever produce prosperity. Rethinking the Ethically inspired small-farmer approach to development was essential if development was going to happen at all.

Tropical-Colonial Economics and the Theory of Dual Economies

J. H. Boeke, by 1920 a well-respected economist in the Indies, offered one of the most important and heavily studied critiques of colonial economic policies, the theory of dual economies, which questioned the Ethical assumption that successful European technologies would produce prosperity in the colony. Boeke, a graduate of Leiden University, published his doctoral dissertation in 1910, entitled, *Tropical-Colonial Economics: the Problem*, which elaborated his criticism of Ethical thinking. This dissertation became a significant resource for those trying to understand the failures of development in the colony and later a foundational document for the field of tropical-colonial economics. Boeke argued that it was not reasonable to treat the colony with the same set of economic principles and policies as those applied in Europe because the colony had not one economy, but two: the economy indigenous to the region and persisting after colonial takeover, and the European economy, producing raw materials of high value on the world market and operating according to the conditions prevailing in Europe. The presence of a dual economy, Boeke asserted, meant that solutions designed for the European economy would fail in the colony because they would only make sense to those on the European side of the fence. In the case of development, where the problem was by definition centered in the indigenous economy, European solutions would founder on the significant differences between indigenous and European economic needs and behaviors.

Boeke was eager to dismiss notions that the indigenous people acted irrationally, although he did characterize their economy as primitive in comparison to the European one. Instead, he argued that both economies operated under different sorts of rationality, defined by the rela-

tive importance of two kinds of needs: social needs, which prevailed in primitive societies, and economic needs, which held sway in more "advanced" societies. Economic needs were those basic to the lives of individuals and their immediate families, including food, shelter, and clothing. Social needs were those that a person required based on social expectations. An example of a social need in indigenous society was the Muslims' desire to make the *haj*. The expensive journey to Mecca would confer spiritual and social prestige, but could not be said to satisfy an economic need. Economic growth, argued Boeke, required the expansion of individualistic economic needs, which he believed to be more productive for growth than social needs. Boeke defined the European economy as one in which economic needs had expanded rapidly and spontaneously as evidenced by the growth in trade, the transition to individual ownership, and the collapse of feudal relationships, something that had not happened in the Indies' indigenous societies.

The existence of social needs was not in itself a problem because social needs often transformed into economic needs. Boeke gave as example a man who kept cattle primarily for their prestige value. If he then decided to increase the size of his fields to produce more food, he would suddenly start to see the cattle as tools to help fulfill his new economic need. He would then start to buy cattle selectively, choosing the strongest and most docile animals, with well-bred cattle becoming an economic need, and a new kind of economic good. Boeke resorted to climactic determinism, and the familiar fantasy of tropical life, to explain why such social needs had not transformed in the tropics, arguing that it was simply too easy to satisfy the requirements of food, clothing, and shelter, so social needs rarely transformed into economic ones.

Boeke explained that plans to improve indigenous welfare failed because they tried to supply the means to satisfy economic needs that did not yet exist. Policymakers (and Boeke named H. H. van Kol, a prominent advocate of Ethical development, specifically) suffered from a "historical material optimism" in which they assumed that improved work organization, and modern relations of production (and in this Boeke included ownership of land and freedom from corvée labor), would produce development.[2] Boeke argued that such policies ignored the needs that motivated the indigenous people. Road building exemplified this problem. Policymakers assumed that providing roads would stimulate trade, when in fact it was the desire for trade that stimulated road building. Until the indigenous people felt the desire to carry on long-distance trade, the presence of roads themselves would do little or nothing to improve their economic position. Likewise, Boeke criticized planners' educational policies. Education only made the satisfaction of existing needs easier; it could not in itself stimulate new needs. The result was resentment rather than gratitude on the part of the indigenous people, who bore the costs of such programs. In a purely European economy, where economic needs were shared throughout society (Boeke optimistically assumed), the slippage between the social perception of what was needed and what a policy ought to provide was typically rather small. People might disagree on which policy might best increase the national wheat harvest, but they would probably not

disagree on the social utility of such an increase. This fundamental agreement on the problems that needed to be solved, an agreement borne out by a set of shared, perceived economic needs, was missing in the colony's dual economy.

While policymakers and experts did not necessarily take up Boeke's often-hazy distinction between social and economic needs, his description of dual economies governed by different cultural and social foundations of rationality became a popular resource for those investigating the problem of development in the Indies. Boeke's influence and reputation in the Indies grew through the 1920s and 1930s into the 1940s, when he published his two classic works on dualism in the Indies economy: *The Structure of the Netherlands Indian Economy* and *The Evolution of the Netherlands Indies Economy* (Boeke 1942, 1946). Boeke himself fluctuated between optimism and pessimism over the years, as he tried to read the lessons of the dual economy for the project of indigenous development, especially with regard to whether improving indigenous welfare under conditions of the dual economy was possible at all. He strongly challenged Ethical assumptions on the one hand, but on the other hand, he worked to understand what kind of interventions would produce prosperity, in clear sympathy with Ethical goals. His dissertation itself was predicated on understanding more clearly the indigenous economy's functioning and the interactions of the European and indigenous economies. His work therefore embraced the bridge-building desires of Ethical reformers and harmonized well with later extension specialists' detail-oriented knowledge-gathering.

Boeke's macro view of economics in the Indies appears to have been largely theoretical. It is hard to judge whether Boeke did field research himself, or if his interpretation of the indigenous economy was based primarily on the work of Leiden's famous Indologists, with whom he must have come into contact as a student. What is clear is that the dissertation was at least a broadly generalized view of the indigenous people that fit many standard colonial preconceptions and did not take into account the great differences in economic practices across the islands. (His later work was unsurprisingly far more detailed and carefully documented.) As with some Dutch colonial scholarship and orientalist studies in general, it sought to elucidate the crucial differences between Europeans and the indigenous people, without, however, seeming to consult the indigenous people themselves (Said 1994). In this respect, it called up the nineteenth-century debates over economic policy that questioned the existence and import of cultural differences between Europeans and the indigenous people. For all the shortcomings of his early work, however, Boeke's criticism offered analysts a macro-analysis that helped explain why indigenous farmers did not prosper even when they participated in development projects.

The emerging field of agricultural economics complemented critiques like those of Boeke by using micro-studies of farms to provide new ways of thinking about the relationships among technology, productivity, and prosperity. Ethical planners had long assumed higher yields would improve incomes. Agricultural economists disagreed. With an eye to crop marketing

and farm households, agricultural economists argued that individual farmers would improve their economic situation only if they could judge the costs of production (capital and labor) in relation to the crop's expected market value. Increased yields would do no good if crop prices were too low to compensate for the farmers' investment of time, labor, and money. Improving indigenous welfare meant farmers needed help not only in technical matters, but also in economic education, a field of expertise that had not figured prominently in the Department. Just as Boeke had argued that the colony represented a unique economic setting, so did colonial experts assert that the standard agricultural economics used in Europe or the United States would require adjustments to cope with the colony's realities.[3]

A good example of both the promise of and the problems with agricultural economics was its treatment of farm labor. A. M. P. A. Scheltema, a statistician who had joined the Department as a member of the newly formed Statistical Bureau for the Inspectorate of Native Agriculture in 1920, addressed this question at a conference of agricultural consultants in 1923 (Scheltema 1923)[4] Scheltema asserted that the increased profits from a larger harvest were often greatly diminished by the increased cost of labor for such a crop. Farmers usually paid laborers in kind rather than in cash, especially the *bawon*, or village women who did much of the harvest (Scheltema 1923: 38-39). The *bawon* wages therefore moved up and down with the value of the rice, and the farmers' saleable excess decreased according to the number of workers. If the profits from increased harvests were indeed eaten up in the increased cost of labor, here was an explanation of why farmer prosperity did not seem to improve, even when selected varieties helped increase rice harvests. (They paid little attention to the prosperity of the *bawon*.) If farmers would pay a fixed wage valued according to time, then they might make more money, but at the risk of alienating their neighbors, some of whom depended on such work for their livelihood.

How could agricultural economics help, faced with practices that were deeply entrenched in many areas? Scheltema's answer was that some indigenous farmers were ready for such a change, and more importantly, others were not. Only by targeting those who were ready would the new practices spread. Rather than finding ways to discipline all farmers, either by modifying the technologies or changing the political situation under which they worked, Scheltema and others simply used the development problematic to define a new, smaller group of potential users who would voluntarily discipline themselves because they were already becoming "developed." Scheltema asserted a linear view of development common for the time, in which people were thought to progress from a stage of communal, subsistence primitiveness to capitalist, free-market practices. Taking Boeke's dual economy idea one step further, Scheltema saw Java as a multiple economy, in which groups at different stages of development coexisted, rather than being separated by time, as he claimed was the case in Europe (Scheltema 1923: 5-9). He cited the successful, market-oriented, indigenous Sumatran rubber producers as an example of an almost-fully developed group, while the hunting-gathering lifestyle of the Oringgoeps of West-

Women harvesting rice c. 1920.
Collection of the KITLV, Leiden, The Netherlands, 5431

ern New Guinea represented the most primitive. He quoted J. W. Meijer-Ranneft, a colonial commentator, who had said: "Here we live in all centuries at once," to which Scheltema himself added, "sometimes in a very small area" (Scheltema 1923: 8). Rather than try to persuade every farmer in this confusing environment, the Department should simply identify those closest to the final developed stage and help them take the easiest final steps. The demonstration effect of these farmers would, in theory, persuade those on the rung below to push forward and so on down the line, as each succeeding group would offer an example and a hand up to the group below.

For Scheltema, those at the less-developed end of the scale would not be able to make the same kind of changes that those at the more-developed end of the scale could. For example, he argued that the basic agricultural economic dictum that "time equaled money" was as meaningless to indigenous farmers as the necessity of the *selamatan* (a ritual feast) was to Dutch officials

(Scheltema 1923). Farmers operating close to subsistence level might appear to be losing money according to the terms of agricultural economics when family wages were included in labor costs, but they might still prefer that life to theoretically higher coolie wages (Scheltema 1923: 21). To produce development, Scheltema argued, planners would have to tailor their projects to the individual or group's stage of development, focusing the most ambitious efforts to transform indigenous farming on only those at the highest levels (Scheltema 1923: 23). The rest would get a different sort of help, more appropriate to their respective levels of development, producing a slower, but steadier course of improvement.

Scheltema proposed that the Department initiate farm analyses or surveys (*bedrijfsontledingen*) to study the "various factors that influence the outcome of the farm" especially with respect to the farm's profitability, in an effort to collect solid data on which to base later development plans (Scheltema 1923: 9). For Scheltema, it was critical that such surveys improve on the researches of the past by seeking to highlight regional differences. Scheltema's answer drew on the convictions already widely held in the department that the correct approach to improving farming was to become familiar with and respond to Java's heterogeneity, and most importantly, to understand it as fundamentally different from Europe. While extension experts had looked to match rice varieties to local ecological conditions and indigenous preferences to increase yields, Scheltema imagined that the entire approach to development required an understanding of the differing socioeconomic conditions on rural Java (and implicitly, elsewhere), including types of land tenure, labor practices, and participation in the market. Scheltema's call for farm surveys did not go unheeded. By late 1923 virtually every agricultural district had initiated a multiyear project to investigate the economic, social, and natural characteristics of indigenous farming in their region.[5]

Neither Scheltema's nor Boeke's focus on the multiplicity of economies in the colony was necessarily incompatible with linear views of development, such as the one that Jacob van Breda de Haan put forth in his 1916 work, *Rice Cultivation in the Netherlands-Indies*. Van Breda de Haan ranked civilizations and methods of rice cultivation in an ascending series, arguing that increasingly sophisticated rice agriculture reflected (but did not cause) increasingly sophisticated civilizations. Shifting rice agriculture, known as *ladang* or *huma* culture, ranked lowest, because it required very little cooperation outside the family, no irrigation works, and a great deal of labor from women and children. Irrigation-fed *sawah*, in contrast, required village-level social cooperation and more labor from men, and thus it resulted in one of the higher forms of civilization among the indigenous people. For Van Breda de Haan, colonial authorities' scientific and technical interventions reflected the highest level of civilization in the Indies. Rather than considering the interplay of these different types of agriculture, Van Breda de Haan imagined each one moving independently along a linear path of development, with some simply having moved more slowly than others. The Department could help by easing each group toward the next level of development.

Combining the dual economy and agricultural economic analyses, experts in the 1920s began to argue that the kind of development that could produce notable jumps in prosperity required not just the right choice of technology, but also the right choice of farmer. A comprehensive report by M. B. Smits entitled, "Native Agriculture" took just this tack (Smits 1925). Smits was an alumnus of the Selatdjaran project and probably inclined to accept the idea that rice agriculture was a trap and that modernity required more capital-intensive agriculture. His findings were generally pessimistic about the average farmer's ability to benefit from development work and very much in keeping with the anti-Ethical backlash of the time. In the indigenous economy, the author explained, work cooperation (meaning, paying in portion rather than in wages) paid off in local social stability (which the people greatly valued) at the expense of "progress" (which they did not greatly value). For the author, new technologies and agricultural education would have little impact in the bastions of the indigenous economy because the indigenous people would only see the progress they offered as disruptive (Smits 1925: 37).

According to this analysis, the greatest opportunities for the Department to encourage change in indigenous agriculture would not occur in places characterized by a "pure" indigenous economy, but in those places where farmers had more routine contact with the European economy. When indigenous peoples came into contact with the European economy by working as wage laborers, leasing their lands to European estates, or producing export crops for European buyers, the author opined, a farmer's success would depend less on the village's social cooperation, and more on his own personal economic and intellectual insight. Under these conditions the author argued, education and extension offered the best chances for encouraging development (Smits 1925: 37). In other words, those farmers who existed at the boundary of indigenous and European societies were the ones who could best profit from the Department's technological initiatives.

If these farmers who seemed to have one foot in each of the two economies represented the best candidates for development, then why had they not noticeably improved their standard of living over the past years? After all, if exposure to Western economic thinking was the key, then farmers who rotated land with sugar estates ought to be showing the most prosperity, a conclusion belied by the noticeable poverty of farmers in sugar areas. Smits, pointedly ignoring the low wages and land-rent payments that were set at levels far below the land's value, argued that while farmers at the boundary could indeed develop, they had also to change their social and economic assumptions in step with the changing circumstances of production, something that had not happened in sugar regions. He clarified his argument by using the example of labor relations on Javanese farms. If for example, a Javanese farmer obtained a larger plot of land, thereby changing his circumstances of production, he would be unlikely to benefit in the same way that a European would. Where the European farmer would experiment with production to achieve economies of scale, a Javanese farmer, with his social and economic assumptions still based on traditional labor relations, would be more likely to let the land to tenant farmers,

leading only to continued poverty. Progress in indigenous agriculture required not simply that farmers be exposed to Western practices, but that they be tutored away from their traditional economic and social assumptions about labor and work on the farm (Smits 1925: 38). For development, the Department had to both show farmers how to increase yields and discourage them from throwing away their profits on wasteful labor practices like tenanting. Such an approach, they theorized, would keep the technical, social, and economic aspects of development marching forward in step.

This report shows how the new recommendations for development, especially the idea of addressing primarily better-off, more "developed" farmers, stemmed from a blending of Boeke's dual-economy thesis and general observations from the field of agricultural economics. (As yet there were few completed social-economic analyses to provide any solid factual data on which to ground their assumptions.) While the Ethical assumption that dramatic changes in the level of prosperity for all farmers would happen simply by introducing new technologies as widely as possible had been abandoned, some Ethical thinking, especially the faith in teaching and guidance, and the power of persuasion facilitated by close contact, remained. Perhaps because technological development had become neither a locus for violence nor a practice vital to the immediate survival of government authority, Dutch development experts rejected the compulsion and threats that had otherwise replaced Ethical social policies in governmental practice and clung to the Ethical belief that some kind of partnership between the Dutch and the indigenous people could still be achieved.

Conclusion

The questioning and analysis of Boeke and Scheltema, among others, provided a powerful critique of existing practices and demonstrates that changes to technologically oriented Ethical policies did not result solely from Fock's decreased budgets, nor from a simplistic rejection of Ethical ideals. Indeed, some of the strongest criticisms against the "betting on the strong" approach, that it neglected the landless and the very poor, could also be leveled against the earliest Ethical development projects, which had always focused on landowners rather than laborers (Breman 1983). The story of technological development in the early 1920s was less about the abandonment of Ethical principles than the literal disintegration of Ethical thinking, as experts abandoned certain aspects of Ethical thinking while holding on to others. Questioning older conceptions of the relationships among farmers, technology, and prosperity, policymakers and experts alike detached the small-farmer ideal from their definitions of proper development and largely rejected the belief that every farmer could adopt the same kinds of technologies, like better seeds, and see positive change. Yet experts maintained, and even found further justification for, their interest in understanding the heterogeneity of Java's ecological and social environment

of agriculture. They clung to the need for "close contact" even while recognizing that budgets would constrain their ability to achieve it. Most importantly, they maintained the fundamental Ethical principle that the right tutelage, this time aimed at the seemingly most receptive group, could lead to improvements in indigenous prosperity. Faced with a combination of farmers and technologies who would not, or could not, be disciplined to produce "development," experts shifted their attention to the small number of farmers whom they believed could use new technologies "correctly" and transition from "indigenous" to "European" modes of production. This narrowing was never intended to permanently exclude the rest of farming society because experts assumed that the demonstration effect would make these developed farmers conduits for change. The process of development across society would happen more slowly, but would still be possible. Even while discarding or downgrading in importance projects aimed at smaller farmers, groups of experts within the Department and elsewhere continued to defend, justify, and criticize technological projects in familiar, Ethical terms.

6

Technological Development and Ethical Idealism in a Post-Ethical Society

J. H. Boeke's groundbreaking dual-economy analysis and the work of agricultural economists offered explanations for why Ethical technology projects had failed to produce a disciplined, "developing" population of farmers who could make technologies like purified seeds produce widespread prosperity. While superficially different from European criticisms of the politically oriented Ethical policies, which focused on the growing social unrest in the colony, the economic/technological critiques shared with those more prominent anxieties an underlying bafflement at the unexpected indigenous reactions to colonial policies. Just as "undisciplined" indigenous activists had favored confrontation and anti-colonial critique over grateful cooperation, so had indigenous farmers absorbed "can't miss" technologies and expert guidance without becoming noticeably more prosperous. The official responses to these two, related sets of criticisms differed sharply, however. Technical planners rejected the coercive discipline employed by the government against indigenous political groups.[1] Instead, technical experts refined their own approach to development, which they based on a new interpretation of rural society. Rather than seeing a relatively undifferentiated (or unimportantly differentiated) mass of small farmers who could all be treated the same, they now began to align their technology choices according to their perceptions of small and large farmers' abilities to use those technologies "properly." What has been called the "betting on the strong" approach was actually a process of finding the right fit between technology and farmer that would help push each person to the next level in an assumed linear path toward development.

This approach, which drew upon perceived differences between European and indigenous economies, revived older, unresolved colonial questions about the trajectory of change in indigenous society. Should development encourage the indigenous people to become more like Europeans, proceeding along the path to development until economic (and perhaps other) differences between the two groups dwindled? Both Raffles and later Liberal critics had assumed this to be the outcome of a just colonial society. Or should the indigenous people occupy a separate economic sphere, with their own "indigenous" definition of prosperity, reflecting the paternalistic, cocooning approach of Van den Bosch (Van Doorn 1994: 197-223)? In the

1920s, development experts and political activists alike would grapple with these questions. Remnants of Ethical idealism would offer little help in resolving the fundamental disagreements about the future of indigenous society.

The New Development Technologies

As the Department responded to the new economic analyses of the 1920s, they began to tailor their technological choices to more closely fit their interpretations of individual farmers' economic possibilities. While this new thinking did produce different views about what sorts of technologies might produce development, at the level of practice, it was not so much a major change as it was an extension of the small-scale approach. Extension specialists simply added new criteria to their list of characteristics that would define the fit of a technology in a particular situation and considered more possibilities than they had with the small-farmer ideal. Rather than assuming food crops to be the correct choice, and choosing new varieties or crops to suit environmental conditions and farmer preferences, specialists began to examine the kind of farming that would best suit the farmers' economic situations. For example, experts pushed well-off farmers who could manage the risk to expand their operations in an export-oriented, capital-intensive direction, sometimes encouraging cooperative associations that could reduce the risk and widen the circle of farmers involved. Small, independent farmers and food crops were not left behind entirely, but with Department's resources dwindling, small farmers certainly received much less attention than they had in earlier years.

A good example of the material consequences of this shift was the Department's renewed attention to fertilizers, especially artificial fertilizers, in the early 1920s. Fertilizer technology had always had its advocates as a promising technology for increasing yields and prosperity. Indigenous farmers already used organic fertilizers of various kinds and were likely to embrace artificial fertilizers with little opposition. The sugar industry had experimented heavily with artificial fertilizers, achieving remarkable yield increases with sulfate of ammonia before 1910. Throughout the 1910s the Department had investigated fertilizers in the same way that they tested rice varieties. They experimented with various fertilizers in different areas to explore how fertilizers responded to soil conditions, crop choices, and crop rotations. Fertilizers proved problematic under the small-farmer ideal of development, however. To make fertilizer use economically sensible, it had to notably increase yields, and it had to be cheap enough not to negate the value of such increases. The artificial fertilizers the Department tested, including sulfate of ammonia, phosphate, and superphosphate fertilizers, were imported from the Netherlands and elsewhere, making them expensive. Extension specialists worked with the Agricultural Credit Service to provide loans for fertilizer purchases, but were unenthusiastic about the outcome (*Verslag Landbouwvoorlichtingsdienst* 1911-1915). Farmers frequently defaulted on these loans,

as fertilizers failed to pay for themselves when used on food crops. Despite their respect for the technical possibilities of fertilizers, experts in the 1910s deemed them a technology that could not produce development (*Toepassing van Bemesting bij den Inlandschen Landbouw* 1925: 13).

The early 1920s saw an upswing in experimentation, as specialists began to consider the uses of fertilizers for smallholder export-crop production. The Department increased their field-testing of fertilizers across the island, comparing the performances of the latest formulations of artificial fertilizers on different crops, and in different regions, and most importantly, with different projected users. They stopped trying to find ways of making artificial fertilizers available to smaller farmers, letting the market price of fertilizer operate more or less freely (*Toepassing van Bemesting bij den Inlandschen Landbouw* 1925: 20). Instead, they only encouraged loans to those with exemplary creditworthiness, as judged by Dutch-owned banks, and discouraged overly easy terms for repayment. Farmers who had relatively large holdings, or cooperative societies that were devoting land to crops like tea and sugar, could use artificial fertilizers profitably, transforming them into a valuable development technology.

Despite this attention to wealthier farmers, the Department did not simply abandon smaller farmers, even if experts believed that the small farmers would never experience the major jump in prosperity that export production could bring. Extension specialists simply found a technology that in their view fit the small farmers' situation better. Reflecting the growing interest in fertilizers, experts experimented with various kinds of "green fertilizers" and tried to determine how much benefit traditional organic fertilizers provided. Green fertilizers were plants that returned nitrogen or other nutrients back to the soil, like the popular *crotolaria*, which the Department promoted heavily in the 1920s. Fast-growing, good for the soil, not yet in common use, and easy and cheap enough for any farmer to propagate, many experts found in *crotolaria* the same kind of Ethically inflected technical promise that had made the "better seeds" philosophy so appealing. Specialists advocated its use between major crops, sometimes putting them at odds with sugar planters, who usually pressured farmers for access to the land as soon as possible (even in advance of their 18-month lease term). All of this work to promote fertilizers had real results. Indigenous farmers seemed to have readily adopted artificial fertilizers when it was financially sensible and abandoned them when crop prices dropped too far, or fertilizer prices went too high, as they did during World War I (*Toepassing van Bemesting bij den Inlandschen Landbouw 1925: 20; Jaarverslag van den Landbouwvoorlichtingsdienst over 1924: 77*). Green fertilizers fared better, especially in areas where there was no pressure from sugar planters.

Comparing smaller versus larger farmers, there was a notable difference in the amount of disciplining the Department exerted. Tea cooperatives, for example, received very intensive instruction from experts for every stage of production and sale, especially when it came to setting up cooperatives and improving the quality of the tea grown. By contrast, when the Department introduced the very popular and highly productive *padi tjina* in the early 1920s, they contented

themselves mainly with propagating the seed and measuring yields. Efforts to create a purified variety remained a lower priority, and farmers were left to grow the rice more or less as they chose.

In the area of agricultural education, colonial authorities made the most noticeable efforts to discipline the ambitions of indigenous youth. In the 1910s, agricultural education had opened a path to the civil service and to well-paying jobs on plantations. T. J. Lekkerkerker, who spearheaded the reforms, argued that education had strayed from its purpose to train farmers and needed to be reorganized to ensure that farmers, not bureaucrats, graduated from the program. He advocated a two-pronged approach to make agricultural education produce this outcome. First, he argued that courses should reduce or eliminate theoretical training in plant sciences and shift their emphasis to practical agricultural and economic training. Students would spend less time in the classroom and more time working the school's attached fields, often as mini-businesses organized to teach farm-management skills. Students would choose crops and techniques based on what would turn the school a profit and give little or no attention to experimenting in those fields, as had been common previously. Graduates of this program would need further education before they would be suited for jobs in the Department. Business training would instead prepare them to become modern farmers, who would accept European economic thinking with respect to labor use, profits, and technologies. Second, Lekkerkerker recommended limiting school enrollments to those students who would have the best chance of putting their education to use on their own farms. He argued that schools should accept sons of landed farmers who would have the means and the opportunity to buy their own land after their graduation, or who could be expected to take over their fathers' lands.[2] While Lekkerkerker intended to guarantee that students would take their knowledge back to the village, he effectively limited the reach of agricultural education to those who came from prosperous families, or who could otherwise show some proof that they would have access to land upon graduation.

Although experts did not abandon small farmers, the new development technologies and educational practices tended to reinforce and magnify existing divisions in indigenous society. Those who embraced export production and artificial fertilizers also became entwined more thoroughly not just in Western markets, but also in Western industrialization, as they became consumers of inputs from far away (Knight 2004: 43-63). Smaller farmers, in contrast, had access to technologies they could propagate themselves at little cost, producing for much the same kinds of local markets they always had, in the much the same way they always had. The landless, or those who depended on some form of labor to supplement very small holdings, continued to be largely disregarded in development activity (Breman 1983: 109). Yet they too would suffer when indigenous farmers changed their hiring or payment practices. In this way, development technologies and techniques gave a new material expression to rural social differences.

Reviving Old Arguments: Export Production and Development

The push to increase indigenous export crop production in the 1920s is a topic that has been widely studied in economic histories of Indonesia.[3] Yet this was not merely an economic story; it also serves as a useful lens for understanding the revival of ideological debates about the relationship between the indigenous people and Europeans, a fundamental issue in colonial rule. Export production, the traditional realm of European producers since the 1870s, became a testing ground for an ideal of development as a process of Europeanization, or economic assimilation of indigenous people into the most profitable areas of the colonial economy. The alternative, equally strongly supported, was the notion that the colony ought to remain "separate spheres" of indigenous and European life, with development operating primarily within the indigenous sphere. However unrealistic the notion of separate spheres was in reality, given the European producers' dependence on the indigenous people's labor and productive activities, the idea of colonial society as two separate spheres appealed to those in both indigenous and European circles who saw the assimilation process as posing social or economic threats. By backing particular development technologies and plans, experts aimed to construct a material basis for their views. Ethical thinking offered no resolution to the conflict between these two positions. While Ethical plans had always called for the indigenous people to embrace new (usually Western) technologies, which hence constituted a kind of assimilation, the small-farmer ideal had tended to help farmers with food production and had never specified whether or not farmers ought to aim to diversify into export production. With new views of development, old disputes about the place of the indigenous people in the colonial economy, which had been sidelined but never resolved by the Ethical policies, re-emerged.

J. van Gelderen, a distinguished colonial agricultural economist and statistician, strongly advised indigenous farmers to diversify into export crops (Van Gelderen 1927). Like Sibinga Mulder and supporters of Selatdjaran, Van Gelderen argued that indigenous people were trapped by their reliance on food-crop production for income. However, rather than argue that indigenous farmers should be "free" of rice production, Van Gelderen suggested that indigenous farmers find crops to complement their rice production, so that each farm could maintain the ability to produce its own food while still producing market crops. In some ways, this was not a particularly radical suggestion. Extension specialists had often encouraged diversification. They advocated *polowidjo*, or dry-season crops like soybeans, peanuts, vegetables, or fruit, rather than a second rice crop in areas that had soil fertility problems, to create additional income, to improve diets, or sometimes to decrease water usage in areas with water conflicts. As Peter Boomgaard points out, new and expanded attention to *polowidjo* on Java probably did more to improve Java's food supply than any rice improvement scheme during the last thirty-eight years

of Dutch rule (Boomgaard and Van Zanden 1990: 42-44). Yet the socioeconomic implications of indigenous export production in the stratified world of colonial agriculture made the idea controversial.

Van Gelderen, like most agricultural economists, focused primarily on income and therefore advocated the expansion of indigenous smallholder work in tea, rubber, and especially sugar. He echoed Scheltema by citing the example of the profitable indigenous rubber industry in Sumatra as the ideal. If rubber growing had done so much to increase the development and welfare of Sumatrans, then could an analogous solution work for the multitudes of farmers on Java? Van Gelderen thought it not just worthwhile, but essential:

> Market agriculture has in far greater measure than old-fashioned food cultivation, a stimulating, welfare-improving effect on its practitioners. On Java there is only room for the intensive types of these crops, like sugar, tobacco, onions, vegetables, and others. Here lies for the trapped Javanese *tani* a possibility for improvement in his standard of living and development of his outlook. (Van Gelderen 1927: 94)

Van Gelderen's enthusiasm for smallholder export crop production, especially sugar, came from a hardheaded economic and ecological look at the realities of indigenous farmers in sugar regions (Van Gelderen 1927: 94). The rent that sugar planters paid for land was based on the value of the indigenous food crops that would have been grown during the lease, a very low value in comparison to the value of the plantation crop. Meanwhile, sugar planters worked the land ever more intensively, and continued to expand their own profits, while simultaneously depleting the soil and reducing the yield of each succeeding rice crop. Under this system, Van Gelderen explained, the owners of the land never experienced the benefits of the more-intensive working of their land. On the contrary, it worked to their detriment (Van Gelderen 1927: 58-60). Additionally, farmers who went into debt based on their crops' poor performance, had to work for the sugar estates to pay their taxes and keep ahead. Their need for work kept wages low and sugar profits high. The only remedy for this situation under existing agrarian conditions was for indigenous farmers to produce more valuable crops and therefore increase the value of their land. Sugar cane itself, Van Gelderen argued, offered the best chance to improve the adverse conditions for development in the colony. Just as Boeke had in his earlier work on dual economies, Van Gelderen envisioned the indigenous people becoming ever more "rational" in their economic behavior, eventually crossing over into the European economy, slowly diminishing the size of the indigenous economy until it disappeared altogether. Development for Van Gelderen was therefore a kind of Europeanization, at least in economic and technological terms.

Van Gelderen's convictions about the long-term need for Europeanization recapitulated earlier notions about the economic relationship between Europeans and the indigenous people.

Raffles and later Liberal advocates of the nineteenth century had argued that the indigenous people needed to become more like Europeans: Their only disagreement had been on what kinds of policies would bring about this outcome, whether law and order, free trade, or land reform. Van Gelderen, like his Ethical predecessors, saw a need for direct technological intervention in farming practices, specifically to train and encourage farmers to enter smallholder export production, using Western techniques of irrigation and fertilization to produce the highest yields. The outcome, however, would be the same as that dreamed of by earlier reformers: a deep integration of indigenous producers and merchants into larger networks of trade and consumption. Unlike Van Gelderen, earlier proponents of Ethical thinking had remained vague about exactly what kind of transformation was needed. Consider, for example, the very modest transformation envisioned by Treub when he pushed his "better seeds" philosophy of development. Just as earlier reformers had confronted opposition from those who saw wholesale transformations of indigenous ways of life impossible, or unwise, so did Van Gelderen and others who envisioned development as Europeanization provoke a reaction against integration in the 1920s.

The reaction against a deep integration of the indigenous people into the European economy reflected broader cultural changes in colonial society, as well as the political conflicts of the early 1920s. While in the nineteenth century some kinds of cultural contacts had been routine, especially the marriage of European planters and officials to indigenous women from elite households, by the early-twentieth century Europeans increasingly frowned upon "mixing" with the indigenous people. Rudolf Mrázek explains how the language of those promoting technological projects, like road building, indicated the Europeans' desire not to get "mired in the muck" of the Indies. Some Europeans used conventional technologies like architecture, radios, and refrigerators to define a sphere of life that was profoundly non-indigenous (Mrázek 2002). At the same time, modern young indigenous men and women of the Indies appropriated Western dress and embraced film and modern music, infuriating the exclusivist members of European colonial society. More ominously for fearful Europeans, the indigenous swing towards political activism had produced strikes and critiques of European rule in daily newspapers and journals (Shiraishi 1990). By the mid-1920s, many Europeans were coming to believe that too much change in indigenous society was bad for the colony, although they did not seem to have viewed technological change aimed primarily at Europeans as problematic (Mrázek 2002). For this group, keeping Europeans and the indigenous people in their own spheres of colonial life was far superior to the idea of integration.

Opinions in the indigenous community were equally divided. Groups like *Perdata* (which, in the Indonesian style of acronym-formation, stood for *Perhimpunan Dagang dan Tani*, the Association of Traders and Farmers) saw in the separate spheres way of thinking a chance to strengthen indigenous society from within, minimizing their interaction with and dependence on the Dutch.[4] This Muslim organization based in Bandung used a dual-economy analysis

to argue that *Bumiputera* (an Indonesian word meaning "sons of the earth") could work to improve their own side of the economy without depending on Europeans, thereby gaining greater independence of action. They proposed, for example, that wealthy *Bumiputera* band together to form banks that would make loans only to other indigenous people looking to expand businesses and farms, therefore helping to prevent the problem of small farmers being forced to become factory laborers. They in fact advocated much the same practices as the Department of Agriculture, Industry, and Trade. Agricultural credit would encourage smarter farming of traditional crops and expanding indigenous export crop production. *Perdata* argued passionately for an agricultural, rather than industrial or wage-based future in order to protect their patrimony ("*Manakah Jang Kita Haroes Pilih Industrie atau Landbouw*?": 46). One writer insisted that people "take up the patjol and forge ahead in our own gardens or sawah." In doing so, however, they should embrace and take charge of their children's modern education, even if it meant sending them to Europe ("*Manakah Jang Kita Haroes Pilih Industrie atau Landbouw*?" 1926).

Other, more explicitly anti-colonial critics agreed that keeping their distance from the Dutch was essential. In 1918, a journalist named Darsono argued in the newspaper *Sinar Hindia* that any farmer who listened to a Dutch agricultural extension specialist was a bootlicker and a fool, because the Dutch clearly did not have the farmers' best interests at heart. He did say, however, that indigenous agricultural extension specialists were trustworthy, demonstrating that the problem was not the Western knowledge or technology, but the questionable motivations of the Dutch themselves (Darsono 1918). Another prominent activist, Semaoen, argued in a different context that the Dutch proposal to create a technical university at Bandung was not a boon for indigenous students, but a transparent effort to create cheap engineers who would become increasingly disconnected from the rest of the indigenous people, a technologically updated version of "divide and conquer" (Semaoen 1916: 88). For real progress to happen, indigenous society would have to move in their own sphere and reject Dutch control.

Some indigenous activists, however, saw strong forms of integration as the key to forwarding the indigenous people's interests. E. F. E. Douwes Dekker based his call for political independence on the need for full equality for all people of the Indies (Europeans, Chinese, Indo-Europeans and Natives alike), which would then allow for constructive integration. He argued that an Indonesian state could unite the "concrete" strength of the West, its technological know-how, with the spiritual strength of Islam, creating a balanced society that retained its own cultural heritage (Douwes Dekker 1912: 414). Djojopranoto, editor of *Jawa Muda*, a newspaper with radical leanings, held similar views. He argued: "Because we haven't yet combined Islam with Western skills [. . .] we not yet prepared to take our proper place under the sun" (Djojopranoto 1916: 24-25). Douwes Dekker preferred to cite the lesson of Japan, noting that it took in the best education regardless of the source and used it to build strength to defend its independence, while not abandoning its cultural heritage. Likewise, the people of

the Indies should bring in foreign knowledge to, in his words, "polish our weapons" (Douwes Dekker 1912: 414). For activists like Douwes Dekker, the social and political separation of colonial society would weaken the state, and integration of all kinds – social, technical, and cultural – was essential for the Indies' future.

Increasing indigenous export production was certainly a more modest goal than those of visionary idealists like Douwes Dekker or Djojopranoto; it nevertheless provoked criticism. Critics had long argued that export production made indigenous farmers too vulnerable to changes in the global market, bringing disaster upon them if the market failed (De Bie 1911: 22-32). Plantation operators fretted that the reputation of Javanese commodities would decline if lower-quality products made it to the market. This worry, of course, only thinly veiled deeper concerns about the possibility of competition with smallholders that might ultimately force prices down. The Department's practical response was to compromise by encouraging indigenous export-crop producers to sell primarily to European planters. The pragmatic shift to a separate spheres approach made European producers the necessary intermediary for indigenous peoples to interact with the global market.

One early initiative that took this approach was the encouragement and modification of indigenous tea planting (De Bie 1911; Lekkerkerker 1926). In 1910, H. C. H. de Bie, after an extensive study of Native tea planting in the Preanger Regentschappen, proposed that the Department work to expand Native tea planting and encourage techniques for planting and plucking that would produce higher-quality tea that could be sold to European estates (De Bie 1911). De Bie's initiative responded to both indigenous agricultural concerns and the problems of local estates. If indigenous producers made a good living producing tea, villages would grow, providing both tea and labor to estates. In response to the moral critiques of exposing indigenous producers to global markets, De Bie asserted that the interests were happily complementary (De Bie 1911: 13). In his view, indigenous producers had a fortunate flexibility because they could produce lower-quality products for local consumption if the European market faltered, or turn to their *sawah* and house gardens during hard times. The secret to indigenous tea planting was that indigenous growers could always fall back on the productive and distributive world of the village (De Bie 1911: 22-32). In other words, indigenous tea production would not eliminate the indigenous economy. The indigenous economy was the safety net that was essential to the enterprise's long-term success.

T. J. Lekkerkerker took up De Bie's plans and pushed consistently to provide technical support to the growing indigenous tea industry in the 1910s and 1920s, a scheme considered very successful until the tea market crash in 1929 (*Verslag Landbouwvoorlichtingsdienst* 1914: 40). Through the techniques and organization they promoted, the Department rejected the ideal of development as Europeanization of the colonial economy. Instead, they focused more on techniques to improve the quality of the raw product and less on techniques of finishing that would help the indigenous people produce products ready for the international market. Even

successful efforts to produce tea planters' cooperatives aimed primarily to promote even-quality products and facilitate group purchases of livestock and tools (Lekkerkerker 1926). Most importantly, they operated under the assumption that a (hopefully) thriving indigenous economy would provide the safety net needed for indigenous producers to survive the plantations' up-and-down demands for their goods. Experts worried, for example, that farmers needed to be educated to maintain their tea gardens, even when there was little demand for their product, because the plants themselves had to be kept healthy and well-tended if they were to be of any use when demand recovered (Vroon 1933: 589-593). In practice, this did actually seem to work, at least during World War I. Many indigenous tea planters reverted to food crop production at this time (in some cases due to government emergency regulations requiring them to do so) and successfully moved back into tea planting after the war (Vroon 1933; *Jaarverslag van den Landbouwvoorlichtingsdienst over 1919*: 25).

Smallholder Sugar Cane: Materializing Conflicting Ideals of Development

While tea growing worked well in the mountainous areas of West Java, Van Gelderen and others, like Leiden graduate G. H. van der Kolff, advocated development elsewhere on the potentially profitable cultivation of smallholder sugar cane (Van Gelderen 1927; Van der Kolff 1922). Early plans, implemented experimentally in Pasuruan in 1919, followed the model of tea planting, with smallholders marketing a large proportion of their crops to European estates. The extension service began widely encouraging smallholder cane planting in 1923 (*Jaarboek van het Departement van Landbouw, Nijverheid, en Handel* 1924: 80). Smallholder sugar cane projects, however, proved particularly contentious, and reveal the underlying political conflicts that simmered below the surface of the Department's support of the "separate spheres" position. While some specialists worked to create a harmonious relationship with estate sugar planters, others used their technological relationships with indigenous farmers to support them quietly at the cost of the sugar industry. Technology within the Department was being used to advance conflicting political agendas, underscoring the division in colonial society about the philosophical goals of development.

As early as 1903, at least one prominent member of the sugar community had advocated smallholder sugar planting as a more promising direction for indigenous development (and more profitable for sugar planters as well) than the rice and food-crop orientation favored by Ethical thinkers (s'Jacob 1903: 1-26). By the 1920s, however, the sugar industry was largely unenthusiastic about smallholder cane growing, for exactly the reasons that Van Gelderen supported it. By raising the value of indigenous crops, the lease prices paid by European estates would rise sharply. It was even possible that some villages might refuse to lease their land altogether. While the vast majority of sugar laborers were landless, estates also fretted that

their laborers might start working for indigenous farmers instead. Competition for land and labor would not favor the sugar industry. To fight back, sugar industry supporters raised all the familiar arguments against the practice. They claimed that indigenous producers would grow inferior canes that would damage the reputation of Java sugar on the world market, and that ultimately the global market was too risky for small farmers. The indigenous people, they argued, would be more likely to benefit in the long run from the wages they earned on sugar plantations (*Verslag van het Algemeen Syndicaat van Suikerfabrikanten in Ned.-Indië over het 31e Jaar* 1926: 29-41).

The technical project of teaching indigenous farmers to grow smallholder sugar cane therefore brought to the surface the underlying political ambiguities of the Department's relationship with sugar planters. Intermittent tensions between the two suggest that the Department was not simply a lackey of the sugar industry, yet it is also clear that sugar planters did sometimes manage to influence the direction of extension work aimed at indigenous farmers. The sugar industry, for example, persistently tried to influence both farmers and the Department to move to earlier-ripening varieties of rice that would free up leased land sooner for sugar production. Between 1913 and 1915 extension specialists soundly rejected such early-ripening (and low-quality) varieties because they would damage farmers' economic well-being, and specialists spoke out sharply against sugar industry pressure to redefine the Department's goals (*Verslag Landbouwvoorlichtingsdienst* 1914: 57).

In the 1920s however, sugar planters had a greater incentive than ever to access leased lands sooner. POJ 2878, a new sugar cane variety developed at the East Java Experiment Station, took the industry by storm with its high yields. However, it required earlier planting than other varieties, sometimes by as much as a month. By the early 1920s, the staunch opposition among Department extension specialists to early-ripening varieties had softened considerably, perhaps in part because of the new conviction that rice farming was not the key to indigenous development after all. By the 1920s, extension workers frequently tested early-ripening rice varieties "at the request of Native farmers." It is important not to interpret those requests too naïvely, however. Because sugar estates frequently offered village heads incentives to return village lands to sugar estates early in the cycle, it is possible that requests from the indigenous community stemmed more often from self-interested village heads than from any great enthusiasm for early ripening varieties among ordinary farmers who had been excluded from the deal-making. In these ways, extension specialists became enrolled in the goals of sugar planters, sometimes directly by experimenting with early-ripening rice varieties, and sometimes with enabling technologies, like fertilizers (especially green fertilizers) to improve the yields of these rice varieties.

Yet the Department's technological acquiescence to the sugar planters' goals was not complete. Resistance to the sugar planters' political and productive agenda did occur, especially when it came to indigenous cane cultivation. An incident in the Djombang area of Surabaya in June 1922 sheds light on the mechanics of this resistance. In the residency of Surabaya, the

Resident and the *Binnenlands Bestuur* had cooperated in a decision to discourage indigenous cane planting, which they felt to be "inappropriate" to the area. Surabaya was a major sugar-producing region at the time. While they could not prevent the Department from helping any farmer who requested assistance, they could forbid proselytizing for smallholder cane production. An extension specialist held classes on cane cultivation, which he claimed came at the request of several farmers in the area, and which he defended as fully in keeping the with the Department's interest in building development through an indigenous cane industry.[5] In a secret memo that started a six-month-long exchange of correspondence on the issue, the Assistant Resident accused the extension specialist of working "on other than agricultural terrain" and noted that such cultivation would not be in the interests of European cultivators in the area (Hardeman 1922). The head of the *Binnenlands Bestuur* took up this argument, suggesting that the promotion of sugar cane cultivation was clearly a political rather than agricultural goal, and that the extension service should have consulted with regional authorities and respected their ban on indigenous cane cultivation (Schippers 1922).

The jab about the extension specialist's political goals was an attempt to separate agriculture (and technology) from politics, a disingenuous move coming as it did from those whose own position intertwined technological and political goals in the form of early-ripening rice varieties. J. E. van der Stok, speaking as head of the Agriculture section of the Department, defended the Department's right to make and pursue development policy, denying the regional authorities' right to restrict the extension service's work. He denied the accusations that the Department had a non-agricultural agenda (Van der Stok 1922). By supporting both projects that were meant to integrate smallholders comfortably with estate sugar growing, and projects that made sugar estates actively unhappy, Van der Stok permitted an environment where conflicting technological politics co-existed. These kinds of conflicts may have contributed to the decision to restructure the Department in 1926. When the state reorganized the old residences into a smaller number of new provinces, the extension services were reorganized under the province, rather than the Department. Although the Department would retain the right to direct their technological activities, this move would certainly give the *Binnenlands Bestuur* more leverage when dealing with extension specialists' activities.

Economically speaking, it cannot be denied that these efforts did help some farmers dramatically improve their incomes, a seeming success for development (at least until the worldwide depression in the 1930s). Ultimately, indigenous sugar growing did expand and flourish, although not at the expense of the sugar industry which also thrived, at least until the economic collapse in 1930. Both cooperating with and resisting the sugar industry, the Agriculture Division of the Department of Agriculture, Industry, and Trade embodied in its technological practices the unresolved conflicts in colonial society between two incompatible ideals: development as Europeanization and development as the maintenance of an indigenous sphere of prosperity that was hierarchically subservient to the needs of the European sphere. The tension between

the two positions was never resolved, being overshadowed by a political crisis of the late 1920s, in which one of the major Ethical justifications for development, that it would create a peaceful, cooperative colonial society, was thrown dramatically into question.

Development, Prosperity, and Peace: The Communist Uprisings of 1926-1927

On the twelfth of November in 1926, indigenous communist organizers in Banten, Batavia, and Priangan staged an uprising. The Dutch government quickly put down the rebellion, acting on information from their own system of police spies. But in January 1927, an even larger uprising occurred in Sumatra. Here it took four days for the government to contain the rebellion of those who had hoped to overthrow colonial rule (McVey 1965; Shiraishi 1990: 336-339). Almost more than the rebellions themselves, that the coordination of these rebellions took place across relatively large areas troubled the colonial government. The mass arrests and internment of activists to Boven Digul in Irian Jaya marked the start of another harsh crackdown on indigenous political organizations, as the government increasingly called on a particularly ominous form of close contact, police infiltration, not just to monitor, but also to disrupt the organizations that they saw as threatening.

Even before November 1926, periodic unrest in the form of strikes and less-successful rebellions, such as the ones that took place in 1925, gave the Indies a sharply different character than the peaceful, prosperous coming-together of its various peoples that Ethical idealists had hoped to create. Some critics began to question the long-standing assumption that development, through increased prosperity, would promote harmony and cooperation in colonial life. As early as the beginning of the nineteenth century, Raffles, for example, had justified his reforms, and plans for British activities in the Indies, on exactly this basis. By 1927, opinions were divided. Some members of the *Volksraad* blamed the unrest on Fock, whose tax increases and cutbacks to the Department of Agriculture, Industry, and Trade, had created enough hardship to promote rebellion. Fock had pushed the people too hard, they claimed, and the people had fought back (Bolhuis 1927: 133-135). Shortly before the 1926 uprisings, Governor-General de Graeff argued along similar lines, saying that Fock's policies had lost the people's trust and that what was needed was conciliation. A good welfare policy that lightened their burdens, he argued, was just as important for controlling the Indies as the "sword of the police and the judiciary" (Bolhuis 1927: 45).

The Minister of the Colonies, Jacob Christiaan Koningsberger, had a slightly different explanation, emphasizing not welfare, but contact with the people as the critical ingredient for a peaceful colony:

It is necessary, in order to prevent communistic feelings in the future, that the contact between the Administration and the people must be as complete as possible. It cannot be denied

that in various areas, a relaxation in this contact occurred, but the fact of the happenings of the last few months, stresses the necessity that it [contact between people and the government] must again be as complete and profound as it was earlier. It is my pleasure to report that in this direction, everything possible is being done. (Bolhuis 1927: 250)

While the Minister's emphasis on contact might have referred obliquely to police infiltration as much as the more benign contact promoted by technological development, it nevertheless represented a renewed interest in what had been a centerpiece of Ethical thinking – contact with the indigenous people. The emphasis on contact in this new context reversed assumptions about the relationship between prosperity and peace. Rather than seeing peace as a logical outcome of prosperity, in the difficult-to-discipline world of the colony, only peace could ensure long-term development and prosperity. This shift worked in favor of the Department, which had long clung, as much as budgets allowed, to their practices of close contact. Indeed, as the work of those promoting indigenous sugar cane production showed, some extension specialists maintained that contact even when it produced conflicts with the *Binnenlands Bestuur*.

J. Kielstra argued for the reversal of the peace/prosperity equation in a speech, in which he claimed that the psychological and material changes of development required an environment of respect for authority and government (Kielstra 1927: 10). These psychological changes (which others usually called social and intellectual changes) would provide the foundation that made development work. If the government tried to push change without this underlying intellectual preparation, the results would produce unrest. One report suggested that agricultural education and extension were for that reason the best possible tools for gaining peaceful prosperity, in part because they had never succeeded in producing widespread, dramatic change (*Mededeelingen der Regeering omtrent Enkele Onderwerpen van Algemeen Belang* 1926; "*Onderwijs en Communisme*" 1928). Further, agricultural extension might be a safer way to shape the people's views than the urban education that many Europeans believed to be at the root of the unrest: "Agricultural extension and education can be of great influence as a guide through the labyrinth of paths on which society is moving" (*Mededeelingen der Regeering omtrent Enkele Onderwerpen van Algemeen Belang* 1926: 76). Ironically, it was the Department's inability to produce the dramatic changes anticipated by Ethical idealists that renewed its appeal to politicians in the wake of the Communist uprisings. Notably, this was not about eliminating the project of development altogether; the government could have done that simply by shutting down the Department's programs for indigenous agriculture, something that never happened.

The traditional assumption that prosperity would bring peace took another blow with the release of the official report on the Communist uprisings (Gobeé, Soemitro, and Meijer-Ranneft 1927). An extensive study on the social and economic situation in the Bantam region, which had been a center of unrest in the November 1926 uprisings, reported that the most economically troubled sections of Bantam had seen the least Communist activity. While politi-

cal activists listed tax burdens as a major complaint, the report's authors dismissed this explanation as opportunistic, rather than explanatory. Many of those most deeply involved came from well-off families with above-average-sized land-holdings, who seemed to have prospered during the 1920s rather than the reverse (Gobeé, Soemitro and Meijer-Ranneft 1927: 26). The authors looked instead to religious movements, youth organizations taken over by shiftless and troublemaking young men, and a general breakdown in traditional social life in the region. C. Lekkerker (not to be confused with the agricultural education specialist, T. J. Lekkerkerker), writing for the *Indische Gids* said: "The search for an 'economic basis' for the uproar of 1926 cannot lead to success" (C. Lekkerker 1928: 298).

Lekkerker, like the authors of the Bantam report, characterized the colonial administration as sloppy and careless. Carelessness about local situations, less emphasis on strong indological training (that is, training in the history and cultures of the Indies), and administrative disruption all contributed, in Lekkerker's view, to the loss of suitable contact with the indigenous people. The Bantam report specifically mentioned the failure of technical services, including agricultural extension and public health, because they had tried too hard to introduce changes the people didn't want. Referring to an unpopular project, the authors of the Bantam report opined that agricultural extension officials would have to accept that sometimes people simply didn't want to plant their crops in rows, and leave it at that (Gobeé, Soemitro and Meijer-Ranneft 1927: 61). Interpreting Bantamese society as highly individualistic and proud, the authors pointed out how agricultural extension had tended to hurt, rather than help, the creation of a constructive relationship. The mistake, however, was not extension itself. Rather, it was the decline in constructive and understanding relationships with the indigenous people, a consequence of Fock's budget-cutting, which the authors (questionably) assumed would have limited the Communists' appeal (Gobeé, Soemitro and Meijer-Ranneft 1927: 408-409). While agricultural extension experts had long argued that close contact was essential because it would produce prosperity, analysts after the uprisings promoted the need for close contact above the need for prosperity, seeing contact itself, whether through the controlling hand of the police or the softer persuasion of a locally well-integrated agricultural extension service, as the colony's most urgent need.

Conclusion

The politics of technological development in the Indies of the 1920s mirrored the wider contests about integration and division that troubled the colony. Development technologies tailored to different classes of landholders, while intended primarily to increase incomes, also created greater disparities of technological practice in villages, materially reinforcing existing village hierarchies. Technical support for indigenous participation in export agriculture gener-

ally encouraged separate spheres of production for indigenous and European producers, but not without some conflicting efforts by a few extension specialists to give indigenous planters greater advantage in their ongoing conflicts with the sugar industry. After the Communist uprisings challenged long-standing assumptions about the connection between prosperity and peace, the outcome was a call for renewed close contact with the indigenous people as a way of healing the rifts of colonial life, an idea that could only have relevance for leaders who felt a profound disconnection and division with the people they ruled.

In some respects, the flaws in Ethical thinking became as apparent in technological projects as they did elsewhere. Even the Ethical ideals that continued to inform technological work in the 1920s had no power to resolve the longstanding, fundamental questions about the social, cultural, and productive relationships within the Indies' plural society. Instead, the logic of technological development, so influenced by Ethical thinking, tended to reinforce divisiveness. The Communist uprisings, with their profound challenge to cherished beliefs about the connections between prosperity and peace, might have put an end to technological development altogether, interpreting it as yet another failure of Ethical thinking. However, the Department's well-developed system of close contact, another legacy of Ethical reforms, gave technological improvement work continued relevance during those years. While the earliest dreams of dramatic economic and technical transformation faded, the slow, modest character of technological development came to be seen as a virtue because it could integrate social, economic, and technical knowledge about indigenous problems:

> Numerous factors of the most different nature exercise individual influence jointly on agriculture, but above all they influence each other greatly. Apparently purely technical questions seem to be linked with the economic and the social; the solution of economic and social difficulties must often wait on the advance of technology, which itself is dependent on the progress of scientific research. Native agriculture forms a complex of factors that are connected to each other in all directions. (Gobeé, Soemitro and Meijer-Ranneft 1927: 80)

To work out this complex, they called for experts who knew enough about culture and language to understand the world of the indigenous people. It was ironically less the Department's success with its "betting on the strong" approach than its commitment to Ethically inspired techniques for close contact, and the detailed knowledge that grew out of that contact, that gave technological development staying power in post-Ethical colonial society.

7

The Legacy of Ethical Thinking during the Depression: Technology's Place in the New Social Welfare

The economic catastrophe of the 1930s spurred questioning about technology and social welfare in the Indies in an atmosphere of growing conservatism within the Indies leadership and increasingly anti-colonial nationalism among indigenous activists. Worries about population growth and calls for greater self-sufficiency accompanied the crisis, just as they had informed public debate during World War I. Unlike the period after World War I, however, overproduction became a central problem. Consumer goods found greatly reduced world markets and in many areas, strains of technological pessimism took a prominent place in public debate. Most industrialized nations, including those with significant colonial holdings, began debating the proper balance between agriculture and industry within the context of creating greater self-sufficiency. The Netherlands East Indies was no exception. Yet in the Indies, the character of the debate reflected the deep political divisions in colonial society. Europeans, whether they agreed with or abhorred the Ethical policies, nevertheless drew on the legacy of Ethical thinking and colonial ideas about social welfare to debate the direction that technological change should take in the Indies, mobilizing an idea of "fit" to justify their sociotechnical plans in industry and agriculture. Indigenous activists eschewed explicitly Ethical terms and debated whether technology projects could produce what they saw as the essential political and social transformation that would overturn, or at least change, the terms of colonial rule. Most indigenous activists had rejected the notion that the Dutch were truly interested in helping them; they began to ask instead what they should do for themselves.

Responding to the Depression

Overproduction and the collapse of markets worldwide deeply affected the productive organization of Indies society in the early years of the 1930s. As world markets for the Indies' most important exports, including sugar, tea, coffee, tobacco, and rubber declined, the infrastructure of plantations and the labor relationships that had sustained them changed as well. On Java, many sugar plantations dramatically cut their land under cultivation, returning enough land to *sawah* that by 1933 one analyst estimated that Java and Madura were producing enough rice for

their own use, although because transport costs had not dropped proportionally, this was less of a boon for Indies society than it might have been (Luytjes 1934).[1] Planters adopted voluntary production restrictions on tea and rubber to deal with the international oversupply. The turmoil in international markets could affect domestic prices as well. Burma, Siam, and Indochina, all vigorous rice producers, attempted to dump their excess on the Indies at shockingly low prices, prompting the colonial government to institute price supports.

No section of colonial society was spared the pain of the economic collapse. Contract laborers working on plantations in Sumatra and elsewhere suddenly found themselves without work. Many returned to Java unemployed and landless; some tried to stay in Sumatra as squatters on idle plantation land (Stoler 1995; Pelzer 1978). While farmers on Java did indeed get sugar land returned to them, many landed and landless people alike found themselves without the wage labor that had become central to village life in the sugar regions. Indigenous producers, whose move to export production in the 1920s had so satisfied agricultural economists' expectations, watched their incomes decline to almost nothing. Some European analysts drew on the dual-economy interpretation of the Indies to claim that the indigenous people were not hurt much by the Depression because of the "elasticity of the indigenous economy," or the indigenous producers' ability to return to subsistence farming during times of poor markets (Koens 1930: 961-970; Netzyll de Wilde 1935). In reality, life in the Indies had always been far more integrated than any simplistic "separate spheres" analysis could capture. Some farmers had land that was unsuitable for many kinds of food production, as was the case, for example, with many tea producers working in the uplands of West Java (Vroon 1933: 591). The landless population (routinely ignored or minimized in dual-economy analyses) had relied on European plantations or indigenous farms for work. During hard times, they had trouble finding any kind of employment. European plantation operators, their mid-level European or Indo-European employees, and small-business owners, who supplied the plantation sector with goods and services, found themselves facing bankruptcy. The Netherlands, with its own armies of unemployed workers, was no haven to which they could return. Indigenous and Chinese traders and small-business owners suffered too, as the local economy contracted. Government employees were not much better off, given the dramatic budget cuts forced by the equally dramatic decline in state revenues.

In such circumstances, it should come as no surprise that social welfare projects of all kinds faced significant budget cuts and became the subject of a new round of critiques about their effectiveness and direction. Some opponents argued that the projects cost too much money and produced too little improvement, therefore constituting a waste of government funds. A. Netzyll de Wilde, for example, drawing on European stereotypes of a feckless and fecund (and therefore somewhat threatening) indigenous society, argued that welfare programs had done no more than facilitate an increase in population, with no visible improvement in standards of living (Netzyll de Wilde, Moll and Gooszen 1936: 21). The few who argued for the elimination

of development programs were in the minority, however. Most critics, even those holding a negative view of the government bureaucracy, did not call for an end to development programs. Instead, they called for more efficient implementation.

The specific meaning of efficiency in this debate is most clearly understood in relationship to Ethical idealism as it had played out in practice. The "inefficiency" that critics discussed was related to the problem of fit. In short, critics argued that existing welfare programs too often tried to force a change of technology or technique that the indigenous people themselves did not want, and which therefore did not fit indigenous society. Despite experts' efforts to attune their technologies to local needs and circumstances, critics argued that welfare programs had simply not gone far enough to guarantee a truly productive social integration of either the aims of development or the technologies that were meant to bring those aims to fruition. The result was wasted money because no serious change ever seemed to take place. J. J. Schrieke, upon accepting a position as Hoogleraar (Professor) at Leiden University in 1935, argued that Ethical policymakers had never learned the lesson that state goals were meaningless unless those goals were also held by the people themselves. The indigenous people would not agree to any change unless it had an "organic connection with village society" (Schrieke 1935). The problem was that projects, no matter how well meant, were still originating from the top down. A favorite example given by some critics consisted of the failed efforts to encourage indigenous groups to form cooperatives, something that seemed entirely fitting to Javanese culture, but which had experienced only limited success (Van Mook 1930: 12-16; Fruin 1930b: 10). One critic, Feuilletau de Bruyn, argued in a 1933 speech to the Vaderlandse Club that the work had all been done "for the Native, not through the Native" (Feuilletau de Bruyn 1933: 25). This assessment showed little understanding of the actual practice of development, which as we have seen, relied very heavily on the indigenous people's participation, resources, and cooperation.

Another critique of development, one stemming from the colony's reorganization into provinces in the late 1920s, also highlighted the problem of fit, but in a rather different way. Egbert de Vries, who in later years would become an internationally recognized figure in development planning, was at the time an agricultural expert who belonged to *De Stuw*, a group of neo-Ethicists actively publishing in the early 1930s. He argued that the provincial reorganization had unsettled the practice of agricultural extension. Although experts were supposed to take their technical direction from the Department of Agriculture, Industry, and Trade, they were now administratively placed under the new Provinces, confusing the hierarchy of authority and making it increasingly possible for bureaucrats in the *Binnenlands Bestuur* to interfere with development work (Koens 1925: 79-108).[2] As De Vries put it, farmers now saw "a many-headed government expert," who gave conflicting recommendations, none of which reflected a good vision of the whole situation (De Vries 1931: 4). He cited, for example, places where irrigation works were meant to increase the production of trade crops, but where no good roads existed to get those products to large markets. For De Vries, top-down development had ceased work-

ing because it had been decapitated. To fix the problem, De Vries argued for central coordination, based on intensive information gathering and "a solid knowledge of area, people, land, crops, schools, and past history" that could combat waste and achieve useful ends (De Vries 1931: 5-6). He found support from others, including some Residents, who believed that this coordination should fall into their scope of responsibility (Van der Plas 1934: 3-4). Although his diagnosis of the problems differed from those of other critics, his solution nevertheless also imagined that a better fit of project to place was needed, where a knowledgeable, local coordinator with a comprehensive understanding of the region would be the one who had the right scope of vision to determine the best fit. The government did respond to such criticisms after a fashion, by creating a Department of Economic Affairs, of which the old Department of Agriculture, Industry, and Trade would comprise one section, and appointing the agricultural economist J. van Gelderen as its head (Fruin 1933: 50-53). This Department did coordinate welfare planning, but never as intensively as De Vries had advocated.

Despite the seeming congruence of opinions about the need for development that better fit indigenous society, the critics of top-down planning had more success than those of De Vries's camp when it came to reshaping development practice. This was, in part, because their attention to the problem of fit and initiative in development considered costs. In the Economic Work Plan of 1932, a comprehensive program intended to combat the widespread economic decline in the Indies, the authors made the familiar point that top-down welfare projects did not have the power to become well-integrated, constitutive elements of the society in which they were placed (*"Het Economisch Werkplan"* 1933: 2154). The consequence was that such projects did not work as desired or required such intensive leadership to work properly that once the leadership (of the agricultural extension service, for example) was removed, the people would quickly revert to earlier practices. Therefore, the inefficiency of welfare work resulted from its top-down character, its "all-permeating interference" (Schrieke 1935: 8), and its tendency as a result to get "stuck in the mud" (*"Het Economisch Werkplan"* 1933: 2154; Mrázek 2002).

Critics of the top-down approach suggested that fit would best come not from experts' ever-more-intensive guidance, as De Vries suggested, but by handing some responsibility for initiating development programs to the indigenous people themselves. Instead of pushing development from the top down, the government should facilitate it from the bottom up. Government experts would focus on consultation, education, and some extension, but limit their efforts to those projects that the people themselves requested. The indigenous people would have to prove their commitment to any kind of project before the government would commit funds: "Where there is a request for help, because people feel the need for it, then the execution of the assistance will find an organic connection with the place in which the interested parties are working" (*"Het Economisch Werkplan"* 1933: 2154). Discussions in the *Volksraad* in 1932

repeated these ideas, emphasizing the artificiality, failure, and therefore waste of top-down programs, as compared to the organically integrated, successful, and therefore efficient nature of bottom-up development (*"Economische Beschouwingen in den Volksraad"* 1932: 624).

Certainly, it is no coincidence that the sudden desire to give the indigenous people more say in development decisions happened at the same time as an unprecedented budget crisis. While I have found no evidence to prove this, it may be that a few advocates of these bottom-up plans anticipated that the indigenous people, whom many Europeans regarded as deeply conservative in their technical practices, would not ask for anything as ambitious or far-reaching as typical government projects. Perhaps some hoped that welfare projects would simply fade away through neglect and attrition. Few critics openly expressed such cynical positions, so it is hard to determine whether such thinking may have been lurking in the background. Nevertheless, while most wanted to see the government spend less, many still found the idea of development to be useful and necessary for the Indies. The idea of organic integration had both political and economic appeal. The people of the Indies had not forgotten the Communist uprisings, which colonial officials tended to blame on the problem of rapid change that was poorly integrated into traditional life. Perhaps bottom-up approaches could provide positive outcomes with little political or financial cost (Schrieke 1935: 8).

The bottom-up projects, and the philosophy behind them, operated under a different set of assumptions than those that informed Ethical idealism. Ethical policymakers had always seen technological or intellectual change as something the indigenous people would not even know to ask for, and therefore needed to be given. The new projects took for granted that there would be initiative and active interest in development coming from the indigenous people themselves, something that had happened often over the previous twenty years of development work. A few advocates of bottom-up approaches even argued that the initiative already evident in indigenous society proved the success of earlier Ethical development policies. H. G. Heijting, for example, argued in the *Indische Gids* that the efforts of such indigenous organizations as the *Indonesische Studieclub*, *Boedi Oetomo*, the *Partai Nasional Indonesia*, and *Taman Siswo* to build schools, clinics, and consultancy bureaus on technical and legal issues showed that indigenous society had matured under the influence of development and was now ready to move forward on its own (Heijting 1930: 865-870). In a 1935 speech, Schrieke also suggested that the actions of past development programs had produced positive outcomes that offered hope for the future. This optimistic view of indigenous society and its willingness to embrace and initiate change made the bottom-up approach seem both appealing and workable.

Some advocates for bottom-up approaches saw the Ethical past in a much more critical light. In his speech to the *Vaderlandse Club*, Feuilletau de Bruyn argued that it was high time to do away with the Ethical policies and instead run the country on the basis of a "material welfare policy that takes efficiency as its guide" (Feuilletau de Bruyn 1933: 27). Yet even though the bottom-up approach rejected earlier Ethical policymakers' assumptions, it nevertheless relied

for its existence on the fruits of Ethical labors. Whether castigating Ethical development as a failure or extolling its positive results, critics constructed their reformed plans for development on a similar philosophy of fit that had emerged from Ethical development work during the 1910s. The Ethical requirement of close contact with the indigenous people had built through the years an undiminished appreciation for the complexity inherent in Indies society and nature, as well as a conviction that development could work only if it harmonized well with local conditions. Experts had increasingly relied on input from the indigenous people to decide what constituted a good fit. Extending this approach to its logical conclusion, the best way to achieve a proper social and economic fit was to have the indigenous people themselves decide what changes they wanted (Boeke 1927: 157-192). Likewise, just as Ethical thinking had promoted harmonious close contact as crucial for designing successful development projects, so did the bottom-up approach push this thinking to its limit. Indigenous people would need to initiate contact with expert consultants, and their willingness to work together with the experts would therefore be a precondition of development, rather than something that had to be painstakingly constructed. So while bottom-up technical change represented a rejection of certain key aspects of Ethical thinking, in another respect its logic stemmed from Ethical ideals and Ethically constructed practices.

Challenging the Technical Choices of the Past

The interest in more bottom-up, "efficient" planning did not mean that the government stepped out of the welfare-planning business entirely. In some respects, the projects advocated in the Economic work plan looked very much like business as usual, although the export-oriented strategies of the 1920s largely disappeared. Despite the oversupplies of many commodities, the government nevertheless continued to encourage measures to enhance productivity, shifting their focus from the indigenous export production of the 1920s to domestically valuable crops, especially food crops. For example, they advocated intensified work on rice selection, with a linked, soil-mapping project to ensure that rice varieties were appropriate for a given area. They also suggested work to develop drought-resistant strains of indigenous crops and encouraged increased production of domestically traded commodities like coffee, kapok, and cotton (*"Het Economisch Werkplan"* 1933: 2155). The *Volksraad* fell in step with this approach in 1932, advocating a plan to distribute fertilizer to indigenous farmers and provide loan capital to help establish and expand the technical basis for inland and sea fisheries (*"Economische Beschouwingen in den Volksraad"* 1932: 626). *De Stuw*, the publication of the neo-Ethicists, repeatedly argued for the continuing importance of the agricultural extension service in its traditional role as a teacher of productivity-enhancing techniques, something that the *Volksraad* also supported.[3]

Yet an alternative narrative that took a more pessimistic view of the ability of technology, especially technology that increased production, to make any real difference in the indigenous people's lives, also became evident. A few critics began to suggest that farmers would be better served by learning more about marketing and agricultural economics and less about techniques of production. Some members of the *Volksraad* criticized the Department of Agriculture, Industry, and Trade for spending too much time on science and not enough time investigating the economic character of agriculture (*"Economische Beschouwingen in den Volksraad"* 1932: 626). They called for the Department to start a consultancy bureau in the area of trade that would be given the same level of attention as its other, more technically oriented work. The Economic Work Plan of 1932 justified this approach by echoing Boeke's claims that it was necessary to create economic needs in advance of technical education. As a result, they called for efforts to strengthen households economically through education in trade and marketing, as well as in the traditional areas of credit and cooperatives. The government should therefore concentrate on providing help with market analyses, developing propaganda for Indies' goods, exploring new potential uses for existing crops, and educating people about all of these aspects of business.

Even those actively involved in agricultural extension began to question their earlier belief in the necessity or benefit of technologies of productivity, reinforcing the narrative of innate differences between Europeans and the indigenous people. For these critics, technology could not resolve these inherent problems. A. J. Koens, for example, noted from his own experience that Indies' farmers really needed very little outside technical knowledge to be successful, as compared with farmers who owned plantations or larger holdings, for whom technical knowledge was vital (Koens 1930: 965-969). Others made similar claims that tended to reinforce the idea that no amount of technological change would produce a dramatic difference in indigenous prosperity. One critic argued in the *Volksraad* in 1932 that it was well known that welfare projects for the benefit of the indigenous people would never lead to an increase in income or prosperity in the same way that they did for Europeans operating on a larger scale, with different economic assumptions. If indigenous businesses did change their methods, the government ought to carefully analyze whether it actually produced any improvement in the area's prosperity (*"Economische Beschouwingen in den Volksraad"* 1932: 625-626). Others claimed that population growth (one figure suggests thirty-seven percent in twenty-five years) quickly absorbed the higher yields that technological improvement brought about. These observations played on the Dutch cultural notion that the indigenous people were "stuck in the mud" and simply incapable of responding to change in positive ways (*"Economische Beschouwingen in den Volksraad"* 1932: 625-626; Mrázek, 2002). This family of critiques used dual-economy ideas to assert the futility of most technological changes within an indigenous economy, ignoring or minimizing the role of the international global economy, and leaving out the ways that even small farmers could be affected by the fates of European planters.

One consequence of the collapse of many European plantations that affected farmers directly or indirectly was the flood of contract workers returning to Java from plantation work on Sumatra. Landless people returning to their home villages were simply that many more mouths to feed from the proceeds of the same land, and that many more agricultural laborers in search of less and less work. The emigration of farm people from Java to other islands in the Archipelago (which in the Indies came to be known as transmigration) had been proceeding on a relatively small scale for more than twenty years. During the 1930s, these projects gained new relevance and received increasing attention from the government, who looked to transmigration as a solution to population pressure on Java. In principle at least, the idea of moving highly productive *sawah* farmers to the Outer Islands (especially Sumatra and Borneo) had enormous appeal. Intensified food crop production on these other islands could not only support settlements of Javanese farmers and workers, but also in the long run might help the Indies attain food self-sufficiency, an idea that had also gained considerable appeal with the chaos in international markets. This enthusiasm for redistributing populations was not limited to the indigenous people of the Indies. A few Dutch social reformers advocated Dutch settlement in West Papua as a way of coping with the unemployed people in the Netherlands, using the Indies to solve an economic and social crisis back home (Meijer-Ranneft 1937; Winkler 1936).

Transmigration projects generally required more than simply transplanting the farmers. It also required some work to prepare the infrastructure of the new areas, including roads and irrigation works. The Department of Public Works attempted to parlay this new enthusiasm for transmigration into a greater piece of the colonial budget by pointing out the significance of irrigation works in what they called "the development of the Outer Islands" (De Jonge 1932; Bastiaans 1933: 1183-1188). It was certainly true that the potential for irrigation was one of the most important criteria used for selecting likely sites for transmigration projects. (4) Working in their favor was a proposal by Van Gelderen, the Director of the new Department of Economic Affairs. Van Gelderen pointed out that such large public works could serve as relief projects for the unemployed, just as they had in Roosevelt's New Deal in the United States (Kies 1938: 397-412).[5]

Despite the appeal of this idea in certain quarters, there were strong objections, one of which was unsurprisingly the expense of large irrigation works. But critics also drew again on the question of fit to discourage heavy investments in the infrastructure for transmigration. A. J. Koens, for example, wrote a series of articles questioning the wisdom of trying to create intensified agriculture outside of Java. He argued that the intensification was only appropriate in areas with the right (pre-existing) combination of soil fertility, irrigation, labor surplus, and limited availability of land. Islands like Borneo, Sumatra, and Sulawesi, he argued, were more suitable for extensive agriculture, where a relatively meager number of laborers, poor irrigation, poor soil fertility, and vast availability of land made it more sensible to try to achieve lower yields on

Buses and cars carrying migrants to an agricultural colony in the Lampong District.
Source: Collection of the KITLV, Leiden, The Netherlands, photo 53633

more land with less labor (Koens 1934: 229-236; Van der Ploeg 1930: 5-8). Koens elsewhere argued that the role of irrigation or road projects as relief works were also questionable, and that the money would be better spent on Java working on smaller-scale projects (Koens 1934b: 704-707). In a 1932 issue of the *De Stuw* (which, ironically, means "the Dam") the editor, T. A. Fruin argued that all the talk of developing the Outer Islands by Public Works was just a ploy to regain the power that the department had lost over the years by being forced to work with agricultural experts. A government report on transmigration projects gave considerable attention to the problems of assuring that migrants would move to areas where rice cultivation was possible and worried about how to make sure that the migrants fit their new social and ecological environment (De Jonge 1932; Bastiaans 1935). While the history of transmigration

shows definitively that the neither the Dutch colonial government nor the later Indonesian governments ever found a foolproof formula to solve the latter problem, they nevertheless had identified this as a problem of transmigration early on.

But it was not just the voices of a few agriculture experts that undermined support for the Department of Public Works' ambitious plans. When their own practices moved away from operating on the basis of deep knowledge of local areas, they earned serious criticism from the Governor-General. This criticism undermined their own claims (and those of their supporters) that Public Works was contributing positively to the project of development. One striking case involved the creation of a new transmigration settlement in the area of Soekadana, on the island of Sumatra. In 1932, an irrigation engineer by the name of Raedt van Oldenbarneveldt gave insufficient attention to the area's geography when he overestimated the amount of irrigation water the settlement could receive by diverting the Batanghari River. Assuming he could build small irrigation works based in villages, he compounded his error by making aggressive plans for the location of villages (even giving them names) and estimating the costs based on the assumption that the transmigrants themselves would provide the labor for the proposed irrigation works. He then claimed that the area would suit around 10,000 colonists. Based on this recommendation, the Resident initiated a road-building project to serve the new settlements and started advertising immediately in Java for transmigrants. However, an agricultural expert and another irrigation engineer pointed out serious errors in Raedt van Oldenbarneveldt's report. Governor-General de Jonge took the Director of the Department of Public Works to task, saying that a young, relatively inexperienced engineer should never have been permitted to work without additional supervision, and that the Department and the Resident had acted too quickly on the basis of one, very superficial investigation, creating the possibility of serious unrest among transmigrants who would not find what they expected at the new settlement (De Jonge 1936). The project subsequently shrank considerably from original estimates.

Even with the changing attitudes towards technology, including the disenchantment with projects for increasing production and the much increased interest in transmigration, the idea of fit, deployed for multiple rhetorical ends, remained an important resource in public and government discussions about the direction that development should take in the Indies. Like the Ethical thinking of the past however, fit could be cited to support a range of technical approaches, from the most conservative and pessimistic projections that rejected technological change as ineffective to the most optimistic hopes for new, bottom-up development plans. In the contentious debate about industrialization in the Indies, the idea of fit would again come into play.

Industrialization and Native Development

When even a highly successful transmigration project could take no more than about 5,000 people per year, such projects provided no real answer to the growing population of landless people on Java. In the 1930s, some began to see industrialization in the Indies as a far more beneficial course for the indigenous people than either transmigration or seemingly fruitless agricultural projects (Roos 1935). With Japan positioned as either a threat to or a model for Indonesian development, debates about industrialization spurred new ways of imagining the relationship between technology and social welfare, as well as the status of the Indies in relation to the Netherlands and the rest of Asia.

Industrial growth in the Indies had usually been closely tied to the production of export crops. Crops like sugar, tea, coffee, tobacco, and rubber all required some form of processing shortly after harvest to control the quality of the final product. While there had been several half-hearted attempts to promote industries outside (or more distant from) agricultural production during the 1910s and 1920s (primarily in response to WWI) they had not been notable successes. H. H. van Kol, for example, had advocated forced industrialization along the lines of the Japanese model, with the government providing the funds and setting up the factories as needed. The preference for private industry won out instead, but many of the small factories established in the Indies in areas like textiles eventually went bankrupt. In the 1930s, the notion of fit again figured prominently in explanations for this failure. H. J. Broekveldt, for example, argued that the reason for most of the earlier industrial failures was a "lack of organic connection" to the Indies economy (Broekveldt 1932: 637-638). Whether it was for this reason, or because the Dutch viewed the Indies as a site for the consumption, not the production of manufactured goods, non-agricultural industries were still something of a rarity in the Indies of the early 1930s.

Some advocates of industrialization argued that it would not only provide a much-needed source of employment for both the indigenous people and Europeans; it would also constitute an important step towards greater autonomy (as distinct from independence) for the Indies. Instead of decisions being made based primarily on the needs of the Netherlands, it was crucial that new measures reflect the needs of the Indies itself. Although it had been many years since the Indies had been referred to as "the cork on which the Netherlands floats," the Netherlands' direction of the colony remained a sore point for social critics in the Indies. The neo-Ethicists in *De Stuw*, for example, had made it a central part of their political agenda that the Indies needed to operate according to its own interests. They imagined the future trajectory of the Indies as a member of a Dutch commonwealth, independently administered for the good of all residents, indigenous and foreign alike. The neo-Ethicists' notions of social equity may not have been widely shared by many Europeans in the colony, but their idea of the Indies as an autonomous

and self-directed entity harmonized with the views of those supporting industrialization, who saw the colony as more than merely a source of raw materials for Dutch (and other) industries and an outlet for Dutch consumer goods.

One factor that helped make the question of industry and autonomy more vital during the 1930s than it had been years earlier was the flood of cheap consumer goods arriving from Japan, as Japanese industrial producers, like those in other countries, sought markets for their over-supplied goods. The growth of Japan as a major industrial producer had created a complicated economic triangle with the Netherlands. Japan's cheap labor force, lower transport costs, and extensive business networks had enabled them to offer far cheaper products in all Asian markets, including the Indies, than could most European producers. The Dutch, with a more highly paid labor force, could not compete, but the Dutch "open-door" policy for the Indies made it difficult for them to take action against the Japanese. While the Japanese business presence had grown for years, the devaluation of Japanese currency during the Depression made the situation far worse. The Dutch proposed a system of quotas for Dutch goods in the Indies, essentially making the people of the Indies pay to ameliorate the Netherlands' economic woes.

Proponents of industrialization and autonomy offered a different solution. Rather than accept quotas, which in standard, free-market rhetoric they labeled "artificial," the Indies ought to take advantage of their even cheaper labor force and fight fire with fire. Manufactured goods in the Indies could be even cheaper than Japanese goods, not only driving out the Japanese, but also allowing exports that might compete successfully with Japanese goods in other parts of Asia. Supporters of industrialization did not hesitate to mix economic promise with moral positioning, arguing that industrialization fulfilled the colonial government's moral obligations in ways that quotas did not. The editor of the *Bataviaasch Nieuwsblad* argued in this vein that the Indies should be allowed to industrialize according to their own needs, because it was the colonial government's moral duty to address population pressure by providing jobs for the unemployed ("*Industrialisatie-Eisch*" 1936: 843-844). A later editorial suggested that Dutch investors were missing out on a good thing, when it lamented that the Dutch had been unwilling to cooperate in the Indies' industrialization, even when American, English, and Swedish factories had all experienced some measure of success. G. Gonggrijp also suggested the economic benefits that might accrue to the Dutch, but also implicitly raised the specter of political unrest when he argued: "Exactly because the Indies should stay one with the Netherlands, we must do nothing contrary to its [the Indies'] own structure, its own interests, and its own safety" (Gonggrijp 1934: 18).

For other advocates of industrialization, Japan was more than a threat; it was model, not only because of its success in the world market, but because it was the first fully industrialized Asian country. The debate about Japan brought issues about race, and Western vs. Eastern development into the discussion about industrialization. For some indigenous activists, Japan's success was a heady and encouraging example. M. H. Thamrin, a prominent nationalist who

hoped for eventual independence from the Dutch, gave a fiery speech to the *Volksraad* about the Japanese model of industrialization. He argued that the Indies' economic problems came from underconsumption and the drain of capital out of the country by foreign owners. Thamrin asserted that the Indies could and should create industrialization with indigenous owners, just as the Japanese had done (Thamrin 1932). D. H. Roos argued elsewhere that Japan was a pioneer for "colored" people both economically and politically and that their success signaled Asians' ripeness for change. In particular, he argued that the dividing line between producer and consumer along the geographical and cultural divide of West and East was no longer appropriate. Machines, he claimed, belonged to all, not just those in the West (Roos 1935: 7, 33). Responding to Gandhi's call for a return to the spinning wheel in India, an editorial in *De Locomotief* in 1934 asked whether industrialization made sense for the Indies:

> This land has always chosen the country over the city, the quiet of the desa is nicer than the hub-bub of the commercial road, the sweet clanking of the gamelan better than street racket, the reflecting sawah, and the rustling bamboo chosen over the rattle of the machines and the smell of smoke. ("Het Spinnewiel of de Machine" 1935: 165-166)

Ultimately however, this author argued that only modern technology and noisy machines could create a firm foundation for economic development. The "sweet clanking of the gamelan" regretfully had to be discarded and people would have to learn to love the noise and dirt of factory work.

While the existing industrial presence (including plantations) in the Indies was generally owned and operated by European and Chinese residents, several advocates of industrialization specifically conceived of industrialization as a welfare-producing project for the indigenous inhabitants. Feuilletau de Bruyn, for example, while not seeing industrialization as only a welfare-producing project, did argue that the emergence of indigenous industries in the Outer Possessions (particularly the successful indigenous rubber producers on Sumatra) made it conceivable that indigenous people would be able to participate in industrialization, assuming they weren't being held back by Ethical thinking (Feuilletau de Bruyn 1933: 25-26).

The Economic Work Plan of 1932, designed around the theme of economic growth springing organically from indigenous society, argued that education for and consultation with dynamic, interested individuals could root industrial growth in indigenous society, providing a basis to stabilize industry over the long-term. The authors contrasted this optimistic future with the failures of the past, which they saw as stemming from the artificiality of many earlier industrial projects. Small-scale industry, in their view, would be a much bigger success in the Indies than large-scale industry because "large-scale industries would lie more on top of Indies society than be rooted in it" (*"Het Economisch Werkplan"* 1932: 2154-2160).

L. J. M. Feber, who argued for the textile industry's expansion, also pointed to the possibilities of integrating industries with indigenous life. He noted that because there was a tradition of household labor in the Indies, textile production was a natural fit, as a textile producer could take advantage of these home laborers, much as the Japanese relied on small suppliers for many of their industries (Feber 1932: 264-274). One advocate even argued that the spread of electrification, when it occurred, would be a huge advantage, as it would enable people in the *desas* to work in home industries, without having to move to the urban centers (Roos 1935: 36). Feber noted specifically that in order to bring indigenous people into ownership, they needed not technical education, but marketing and trading skills. Like those who promoted bottom-up, agrarian development, Feber said pointedly that the indigenous people had proven their ability to learn new technologies, a dramatic difference from the rhetoric of the early twentieth century. For most of those who advocated industrialization as a welfare project, industry had to prove its ability to help society both by employing the growing landless population in sufficient numbers to make a difference and by making it possible for some members of indigenous society to get ahead. Just as with agrarian development, the logic of organic connection and bottom-up development was key. Although not following the Japanese model in any detail, most of these commentators took Japanese industrialization as an inspiration because it had drastically reshaped an agrarian society and built a commanding position in the world (Roos 1935: 36).

Not all agreed either with the wisdom of industrializing the Indies or with the notion that the indigenous people could ride the wave of industrialization to greater prosperity. Some objections were purely pragmatic. A commonly cited problem was the need for more electrification on Java, as well as other infrastructural support like better roads and transport (*Handelingen van de Volksraad* 1933: 405). However, the more virulent opposition came from those who saw Japanese industrialization as simply inappropriate for the Indies. This opposition came both from colonial traditionalists and from the far-left, Communist-inspired critics in the indigenous community, as explored in more depth in the next section. One of the most vocal and representative, conservative critics who took this view was D. L. Wolff, who gave nearly identical speeches on industrialization in May and July of 1933, one to the *Volksraad*, and one to the *Vaderlandse Club*. His fundamental argument was that industrialization belonged to the home of the empire, not to its natural helpmate, the colony. The future of industrialization, he argued, was only possible "on the basis of a close cooperation between East and West, of hand and head" (Wolff 1933: 36). The indigenous people of the Indies, he made clear, would never be fully capable of acting as "the head" and should limit themselves to their traditional role as suppliers of raw materials. While rehashing a tired cliché about the lack of dynamism among the indigenous people, he also argued that they were neither intelligent nor educated enough to produce the high-quality goods needed for export. He criticized the emphasis on small industries, which, he claimed, could compete with large industries only if they had excellent

machines. But the Indies lacked parts suppliers or people who could fix such machines, which would therefore jeopardize the viability of small industries. He lambasted the consultancy bureaus as staffs of amateurs with no real experience, whose advice would mislead indigenous people to the point of personal financial catastrophe. If industrialization would happen at all, it could only do so on the basis of large or medium-sized industries owned by experienced Europeans and Chinese; anything else would be a disaster (Wolff 1933: 28-36).

Wolff's characterization of the indigenous people as hopelessly ill-suited to industry was not an uncommon objection. A strongly racial and climatically deterministic take on the problems came from C. Kies, who argued that workers in the Indies, due to its fertility and warm climate would never work as hard as needed in an industrial setting. (How exactly soil fertility was supposed to produce this outcome among landless people was not made clear.) He argued against the idea of Japan as a model, because the Japanese were Northern as well as Asian, and therefore not enervated by the climate. He argued further that it would be many years before the Indies had a significant engineer or doctor to lead industry (although, in fact, the Indies had many indigenous engineers and doctors at the time). Kies reinforced the Indies' legal/racial divisions in his plan for industrialization: Europeans and Chinese could own industries because they had natural leadership abilities, while indigenous people should stick to agriculture either on Java or as transmigrants elsewhere because they did not. He pushed the racial classifications even further by taking on the issue of Indo-Europeans, whose self-identification as a separate group from both Europeans and the indigenous people had become more pronounced over the previous twenty years. He argued that because of their indigenous roots, some Indo-Europeans were more sensitive to the climate than Europeans were and therefore would have to stick to low-level clerical or office labor (Kies 1938).

The rhetoric of racialized fitness, whether elaborated climatically as Kies did, or relying on colonial clichés of the "lazy native," drew on the increasing tendency among many Europeans in the colony to delineate separate spheres of European and indigenous society, magnifying the differences between Europeans and indigenous peoples and trying to erect social and physical separations in colonial society (Mrázek 2002). The discussions about the racial suitability of the indigenous people for industry avoided talking explicitly about technological or innovative capacities as one characteristic of difference. Ethical reformers had embraced the idea that a capacity, or at least an appreciation for technological innovation could be taught, and that the lack of this ability was the central problem holding back the indigenous people. By downplaying technological capabilities (which other commentators had recently placed in a more positive light) and emphasizing a so-called lack of leadership, it was much easier to argue that the indigenous people were inherently unsuited for running industry. Deeper worries about what might happen if indigenous peoples became highly involved in industry also informed the virulence with which conservative commentators rejected it. A speaker at the *Vaderlandse Club* meeting on industrialization put a paternalistic spin on the theme, which oddly echoed

earlier Ethical notions about the appropriate ways to develop the indigenous people: "Let us not work together to remove an agricultural folk from their soil and proletarianize them." His next remark, however, revealed his deeper worry: "Let us not call up a spirit we may not be able to rid ourselves of. See how England and Germany wrestle with the problem of permanent unemployment, and reflect on it."(De Boer 1933: 39)

In the end, what few budgetary resources existed focused on small- and medium-sized industries, operating through consultation, while foreign investors did build some large-scale factories in the Indies. A government-driven, forced industrialization in the Japanese mode would play no role in the plans of the 1930s. In 1945, when J. W. Meijer Ranneft published a short book about the Netherlands Indies' future direction (written before the Indonesian declaration of independence in August), he still saw industrialization as a project that was yet to be seriously addressed.

Technology and Anti-Colonialism: A View from the Left

It was not just Europeans who argued about the direction of future technological change in the Indies, but also indigenous activists, many of whom had become decidedly anti-colonial by the 1930s. Unlike their anti-colonial compatriots in India, most Indonesian activists of the era did not spend much time talking about science or technology with respect to Indonesia's future. Among the diverse groups of anti-colonial activists, those on the left, who looked to the Soviet Union and Marxism-Leninism for inspiration, talked most directly about the place of technology in the colonized present and the independent (so they hoped) future. Both Mohammad Hatta, who would later become Vice-President of Indonesia under Sukarno, and Sutan Sjahrir, who would become Indonesia's first prime minister, did address technological questions directly, especially with respect to the Soviet Union and Japan as potential models for technological change. Their socialist-influenced writings in their newspaper *Daulat Ra'jat* (*The Sovereignty of the People*), published in the early 1930s, shed some light on the ways that technology did and did not matter in the nationalist, anti-colonial project.

Due in large part to the crackdown on activism after the Communist uprisings in the late 1920s, the Communist party proper in the Indies had all but disappeared by 1930. The colonial government had interned or exiled many of the leaders (Shiraishi 1997). Both Hatta and Sjahrir were committed nationalists who had spent several years studying and organizing nationalist student groups in the Netherlands, Hatta since 1922 and Sjahrir since 1929. Both had developed an interest in socialist ideals, but had become disillusioned with party politics. When they returned to the Indies in 1931, Hatta particularly wanted to build what he called "education and awareness," not engage in traditional party politics (Mrázek 1994; Kahin 1952). Both Hatta and Sjahrir, with their new organization, *Pendidikan Nasional Indonesia* (PNI,

National Education of Indonesia), became most active in working with fringe groups, often outside of Java, including the very poor and small trade unions with little power and influence, in an effort to engage in their project of education (Legge 1981:151-168). *Daulat Ra'jat*, the newspaper they founded and co-edited, had a didactic quality in keeping with their focus on education, offering historical and contemporary analyses on a range of subjects of local and global interest. They included their own work and that of other local Indonesian contributors, as well as serialized Marx's *Capital*. In *Daulat Ra'jat* Hatta and Sjahrir raised thoughtful questions about technology.

Their interest in technological questions seemed to stem in large measure from the contemporaneous Soviet project of economic transformation. Two articles discussed in depth the results of the Soviet Union's first five-year plan and what was in store for the second five-year plan ("*Rencana Lima Tahoean Jang Kedoea*" (part 1)1932a; "*Rencana Lima Tahoean Jang Kedoea*" (part 2) 1932b). Using the lens of Marxism-Leninism and the examples of both Soviet and Japanese work toward industrialization, the author discussed at length the question of whether either approach ought to be emulated in Indonesia (a name that some nationalists had started to embrace.) The articles on the Soviet five-year plan gave the expected attention to the nature and speed of industrial growth compared with the sorry state of the economy in Western Europe. They explained in some detail the way that the Soviets organized industry, the place of machines in society, and in particularly glowing terms, the collectivization of agriculture ("*Rencana Lima Tahoean Jang Kedoea*" (part 1) 1932a:4-6). Despite evident admiration, the author did not conclude that Soviet-style industrial transformation was right for Indonesia. He instead argued that the Soviet technological transformation first required important social changes, prominently quoting Vyacheslav Molotov: "Strengthening the system to improve the world's standard of living will not be obtained through technology, rather through the new modern social principles."("Rencana Lima Tahoean Jang Kedoea" 1932a:10) The author reinforced Molotov's priority, advocating a revolution in social and psychological awareness as the necessary and defining element of national transformation. Technological change would become important only after this crucial, collective change in mental landscape had taken place.

Japan's history hit closer to home for many people in Indonesia because Japan, unlike Russia, was an Asian society ruled by Asians. As mentioned earlier, some Indonesian activists, like M. H. Thamrin, strongly advocated that the Indies follow the Japanese model, particularly with respect to encouraging indigenous ownership of industry. In a series of articles appearing in *Daulat Ra'jat*, an anonymous author (very likely Hatta) argued that Japan's technological transformation was merely an illusion of modernity that hid the reality of a hybrid feudal-capitalist society within which no true social progress had been achieved ("*Djepang*" 1932a). Despite Japan's astonishing technological achievements, he argued, Japan was by no means truly modern because the largest industries still served only a few of the most powerful people in society. He based his claim that there was little social progress on the lives of ordinary people,

who ate the same kind of food they always had, lived in houses constructed as they always had been, and continued to use hand-made items ("*Djepang*" 1932b, 1932c). Real modernity would be achieved only when machine-made goods were available to everyone, an outcome which he claimed could only happen in a "backward" society if that society had gone through a social revolution, as Russia had done ("*Djepang*" 1932a). The criticism of Japan as a semi-feudal society was a familiar one among socialist thinkers of the era. The lesson that Hatta took from this analysis was not merely that Japan was not the correct model for an Indonesian future. Just as he had in the case of the Soviet Union, he stressed that technology was not a critical agent of change. Technology could become a positive force only when deployed within a revolutionized society.

The editors, as well as several other contributors to *Daulat Ra'jat*, consistently spoke out against nationalist groups that advocated technological or economic change, arguing that such projects were simply premature and possibly damaging to Indonesia's necessary social change. They defended this claim pragmatically by arguing that the colonial government would always manipulate the outcomes of any economic project so that the indigenous people could never truly benefit from them. This latter piece of evidence was treated as common knowledge, a fact that might well have disturbed Dutch improvers who believed that they had worked honestly, and moderately successfully, for the good of the indigenous people. Economic development, for anti-colonial activists, was therefore nothing more than a distraction. They held to this view even when confronting the idea of collectivization, an idea they found particularly appealing. Several authors, including Hatta and a compatriot named Meskoen, found in collectivization a way to ground a foreign Communist ideology in Indonesian reality (Meskoen 1933). They pointed to Indonesia's tradition of communal ownership in villages (something that was not exactly "traditional" as ownership practices varied widely from place to place) and cited the similarities between collectivization and ordinary practices of mutual aid in day-to-day life. An enthusiast for collectivization named Abikoesno Tjokrosoejoso, an activist with the *Sarekat Islam Indonesia* party (PSII), had argued at a meeting of PSII for the immediate collectivization of Java's villages. He suggested that they could exchange export crops for the necessary machinery, and thereby increase the self-sufficiency of Indonesia's farmers from colonial authorities. Tjokrosoejoso argued that this was a kind of "Islamic collectivization" because it built on the Islamic obligation to help others in need (and not incidentally, rejected the atheistic character of Soviet-style socialism) (Tjokrosoejoso 1933).

Sjahrir (under the name "Realpolitker") responded at length to Tjokrosoejoso's plan in the pages of *Daulat Ra'jat*, arguing that such an approach would hurt people in the long run (Sjahrir 1933a, 1933b). Not only would the colonial government manage to prevent any real economic benefits from accruing to farmers, but premature collectivization would distract ordinary people from the real work of revolution and building their own social awareness, directing their energies to superficial changes in technology rather than deeper social and psychological change.

This rejection of current technological action in favor of often ill-defined social change should not be understood as a rejection of technology per se. Hatta often wrote about the promise of machines to transform systems of production after a social revolution. But the timing was crucial, and it was this issue of timing that became the defining question about technological change for most nationalist, anti-colonial activists, whether they advocated violent revolution or not.

Hatta's take on the role of technological change was particularly clear in a never-fulfilled plan he devised for an independent transmigration project. In February 1934, only a few days before he was arrested by colonial authorities for political activities and interned in Boven Digul, he published a piece in *Daulat Ra'jat* entitled "*Self-help Dalam Emigrasi*" ("Self-help in Emigration"). In it, Hatta argued that by carefully managing emigration, a society organized on collective principles could emerge without any help, financial or otherwise, from colonial authorities. On the basis of geometric progression, he argued that a community could start with ten settlers, whose job it was to build their own houses and houses for the next wave (of twenty), as well as to prepare land for agriculture and establish local trade. The next wave would prepare housing for the next group and continue the process of economic growth. Each group would always be involved in working for the next wave, building a sense of collective responsibility, and ultimately, collectively organized economics. As the population grew, this collectively aware society would start transforming their means of production from a technological angle, exchanging traditional agricultural practices for mechanical farming techniques. Hatta's plan reinforced the idea that technological change was not itself a tool of revolution, but a tool that would only become useful after a social revolution.

Not all activists would have agreed with Hatta and Sjahrir in their rejection of immediate technological change, nor would all have agreed that Dutch projects were intrinsically worthless. What we can take, broadly speaking, from the debates in *Daulat Ra'jat* is that for indigenous activists, timing, rather than fit, was the crucial point of contention in issues about widespread technological change. The question was how much real possibility of positive change existed while the Indies remained under colonial rule. Opinions varied on this question, with left-leaning intellectuals like Hatta and Sjahrir arguing that technology could not produce positive change under colonial rule, while nationalists like Thamrin hoped to build indigenous social power and Indonesian autonomy (and eventual independence) through indigenous ownership of industry. In the years after Indonesian independence, Sukarno, in his rhetoric and his program of *Indonesianisasi*, or "indonesianization" of industry and agriculture, strongly encouraged the view that foreign ownership and colonial rule had prevented Indonesians from prospering, retroactively endorsing Hatta's and Sjahrir's claims, despite his political differences with them, and giving those claims particular significance in the new nation's memory of its past (Sutter 1959).

Conclusion: Technology and Development in the 1930s

The idea that development and economic improvement needed to spring from or fit organically into indigenous society informed many Dutch critics' technological views in the Indies during the 1930s, regardless of whether they advocated or opposed technological efforts to improve social welfare. Some used the idea of fit to naturalize the divisions between Europeans and indigenous people. Rejecting the Ethical notion that only technological knowledge and skills were missing, these critics acknowledged Indonesians' technological capabilities, while arguing that certain kinds of technical projects were nevertheless fruitless because indigenous farmers working small plots of land could not benefit from them. Others argued from an even more explicitly racialized perspective that indigenous people lacked the leadership capacity or character to participate meaningfully in industrial enterprises, clothing old tropes about the "lazy native" in new garb.

Some critics operated from a more optimistic standpoint, using the notion of fit to imagine a new kind of development, one that sprang directly from the needs and desires of the Indonesians themselves. These critics also acknowledged the indigenous people's technical capabilities, asserting them as proof of the success of earlier Ethical development. The time had come for Indonesians, whether as initiators of bottom-up welfare projects or as industrial entrepreneurs, to step forward and take a more substantial role. While many Europeans had rejected much of the Ethical framework, the idea that successful development depended on fit, an idea that emerged from Ethical development practices, had become ingrained in Dutch debates about technology and the colony. As is clear from the ways it was used, however, it had also become so flexible a term that it could do nothing to resolve differences of opinion about the colony's technological future and the direction of development.

Unsurprisingly perhaps, nationalists were far less interested in fit (although it did come up at times) than they were in the potential of technology to help transform the Indies politically. For indigenous activists, timing, more than the character of the particular technology, mattered the most. For nationalists like Hatta and Sjahrir, technological transformation without social and psychological change was simply premature and would distract from, rather than promote the revolutionary struggle against the colonial state. Others, like Thamrin, argued for the Indonesian ownership of industry as a part and parcel of the nationalist struggle, a tool to bring about the political future for which he hoped. Internal debates about the technological character of the Indonesian future took second place to the more widely shared concern to ensure that Indonesians themselves would control the process of technological change.

Conclusions

Ethical idealists believed that technology could produce development only if it were presented to the indigenous people in the context of a close and trusting relationship. Indeed, building this relationship became as crucial to the practice of development in the Indies as technological change itself. The Ethical push for close contact with farmers, and the conviction that development had to reach and be of use to the small farmers of Java, found practical expression in Lovink's agricultural extension service. In turn, the routine contact between the extension service and indigenous farmers produced a commitment to small-scale, ecologically and socially tailored projects that became characteristic of development in the Netherlands East Indies. In the early years of the Ethical era, the search for a fit between technologies and local circumstances was clearly about facilitating transformation, as extension specialists soon realized that technical projects needed to find a working compromise between the goals of the state and the sometimes rather different objectives of the indigenous people. Yet, we should not let the seeming modesty of small-scale individual projects blind us to the greater ambitions of development planners. They imagined that development projects had the power not only to increase yields, but also to gradually push indigenous farmers to independently embrace the state's productive goals and the ongoing technical innovation that many planners saw as crucial for the twentieth-century colony's economic and social success.

Even as disappointment with the lack of dramatic results from development work set in by the early 1920s, experts did not abandon their commitment to finding technologies that "fit" given areas and peoples; instead, they elaborated more thoroughly on what factors had to be taken into account to define a good fit. Boeke's dual-economy thesis and the thinking of agricultural economists offered reasons why agricultural experts ought to tailor their projects not just to the social preferences and ecologies of particular regions, but also to the economic capabilities (as experts perceived them) of the farmers themselves. In doing so, they abandoned the small-farmer ideal that had grounded Ethical thinking about the technical and economic transformation of the Indies and introduced a wider array of technologies into the project of development. It was at this moment that it became possible to use the idea of fit in the service of both a transformation not so different from that Ethical thinkers had espoused and a more conservative approach that would reinforce separate spheres for indigenous people and Europeans in the colony. Assuming development to follow a linear path, thinkers like Van Gelderen and Boeke imagined that economic transformation could proceed like a wave. Change would start at the leading edge with those larger farmers who were already very close to the European

economy in their practices. The demonstration effect would encourage the next closest set of farmers to change in crucial ways, bringing them closer to the European economy and so on throughout rural society, as farmers learned from each other. While the wave would move slowly, experts could still help small farmers in ways that would produce benefits, priming them for the bigger change coming later. Just as in the previous years, the idea of finding the right fit between technology and farmer would facilitate transformation.

At the same time, however, those who were less enthusiastic about the idea of indigenous farmers becoming more like Europeans in practice, and perhaps even becoming competitive with Europeans in export production, could mobilize the idea of fit to satisfy a more conservative and limited notion of development. Citing the failure of development to produce notable, economic benefits, they argued that the indigenous people were simply unwilling or unable to change in the ways that Ethical thinkers required. Employing the dual-economy thesis, they argued that rather than fruitlessly try to fight the dualism in the colony, development simply ought to make the indigenous economy prosper on its own terms. Appropriate technologies, therefore, would be those that fit pre-existing productive divisions, but ensured that the indigenous people would benefit more readily from them. Tea planting, for example, was never meant to eliminate the indigenous production of crops for subsistence and local trade, nor was it meant to transform indigenous producers into plantation operators who would compete with Europeans. Instead, indigenous tea producers would receive extra income when European tea planters could buy the tea, but return to ordinary food production when tea was not in demand. Advocates of this approach still worried about many of the same issues of fit that occupied other experts: They considered which ecological areas were most suited to a crop and considered which groups would most readily learn these new techniques and adhere to planters' requirements for standards of quality and consistency. But it was also crucial for development projects to fit what planners like Lekkerkerker and Smits saw as the reasonable and desirable separation of indigenous and European spheres of colonial productive life.

The idea of fit, because it could be used to both advocate transformationist agendas and justify solidifying social and economic divisions in Indies society, had no power to help resolve the fundamental disagreement between the two viewpoints, a disagreement dating back at least to the time of Raffles. Yet, the very flexibility of the idea of fit may be what allowed the project of development to maintain such a broad appeal among a European community that was deeply divided about the transformation of indigenous society. Both sides could make the case that their development plans fit society in a sensible and helpful way. This became especially true by the late 1920s, when the Communist uprisings and widespread nationalist agitation convinced many Europeans that Ethically motivated change had done nothing but stir up trouble and chaos. Many Europeans blamed the unrest on the rapidity of change and the disruption to indigenous ways of life, introducing a new variation on an older, paternalistic discourse about the need to preserve and protect indigenous society. In this political environment, making sure

that change fit into society, which for the Dutch meant that it would not create social unrest, was paramount. A corollary to this was that change needed to proceed slowly, so that people had time to psychologically absorb it. At this moment, development's earlier failure to produce widespread economic growth suddenly became a virtue, as colonial agricultural experts pointed out the ways that their small-scale projects, operating on the basis of close contact, produced positive change slowly, in an atmosphere of social quiet. Even as other Ethical policies lay in ruins by the late 1920s, therefore, the technological project of development continued. And while it was changed in important ways from its earlier incarnations, it was precisely the Ethically inspired insistence on close contact and the small-scale approach to change that allowed development to have ongoing relevance in a dramatically changed political environment.

Within the indigenous community, by contrast, the idea of fit seemed to have far less resonance. To be sure, without more detailed sources on the interactions between extension specialists and individual farmers, it is hard to be definitive. Farmers did after all accept or reject proffered technologies on the basis of whether those technologies fit their needs. Indigenous activists who published in the popular press and spoke out in the *Volksraad*, however, generally concerned themselves with pushing for more development projects to be made available to more people--especially schools and demonstrations. This made the small-farmer ideal the more centrally appealing element of Ethical development projects, as became apparent in the activist push for sugar land cutbacks during the food crisis of the late 1910s, and in their rejection of the Selatdjaran project. While Dutch analysts often saw in development failures an indication that their technological choices did not (yet) fit into indigenous society, many anti-colonial activists held a quite different interpretation. For them, the lack of prosperity in indigenous society simply indicated that despite Ethical rhetoric, the colonial authorities had no interest in allowing the indigenous people to truly prosper. The problem was not with fit, or with indigenous society's ability to transform, even as some lamented the conservatism of peasants in much the same language as Dutch critics. Instead, the problem stemmed from the lack of good intentions on the part of the Dutch.

To understand the gulf that separated Dutch and anti-colonial thinkers with respect to fit, it is useful to consider the ways that some Dutch critics in the 1930s used the term "organic" to define positive change in indigenous society. Arguing that imposing change from above had been a problem, they defined organic change as that which the indigenous people themselves had initiated, as something that grew naturally from the needs and wants of indigenous society. However, the unspoken assumption behind the use of this term was that such natural change would be conducive to the peaceful continuation of a *colonial* society. Such a view of "natural" change was the complete antithesis of that held by anti-colonial nationalists, who increasingly viewed Dutch rule as both unnatural and unjustified. For nationalists, social, political, and economic transformation was a fundamental and indispensable part of their worldview. The bigger question, therefore, was not whether the indigenous people should transform, but whether they

should try to do so while still under colonial control, building their power through ownership of industry, as Thamrin suggested, or biding their time until a nationalist revolution would enable them to both fully direct and benefit from those changes, as Hatta and Sjahrir endorsed. They had no need to discern fit; instead, they were creating a new order.

The favor accorded to small-scale development projects, tailored to local conditions, did not mean that there was a complete absence of totalizing discourses in the colony, especially when it came to defining "the character of the indigenous people." Stereotypes of the Javanese (or even more broadly, indigenous) everyman continued to enter the rhetoric of development planning and critique, as images of the lazy or naïve native, common in elite circles (both European and indigenous), circulated alongside depictions of the hardworking, virtuous native, like the one Abdoel Moeis constructed in his arguments for sugar land cutbacks in the *Volksraad*. In later debates about industrialization, Europeans who hoped to reserve industry as a domain of European control argued about the lack of "leadership ability" among the indigenous people, some raising racial and climactically determinist arguments to define all indigenous people as inherently incapable of participating prominently in industrial change. It is significant, however, that these totalizing views rarely, if ever, translated unchanged into practice. Treub's image of the irrationally conservative farmer on which his better-seeds philosophy was based, for example, did not survive in practice, as experts in the Department gradually began to investigate and work with the diverse rationales that farmers used to make production decisions.

The dramatic, high-modernist projects James Scott describes in *Seeing Like a State* (1998) require an unwavering political will to produce sociotechnical transformations. While such steadiness of intent might thrive under authoritarian rule backed by a profound faith in science, we should not assume that this combination necessarily leads in the high-modernist direction. Most colonies operated under authoritarian rule with little if any democratic participation. Public criticism in this environment could be dangerous, as Indonesian activists who spoke out too loudly found when they were exiled or incarcerated. Yet when it came to projects of social, political, and economic modernization, colonial authorities were frequently ambivalent, seeing in such change both promise and threat. In the Indies, the idea of development enjoyed widespread popularity, but primarily because the term encompassed a range of sometimes-incompatible notions about the transformation of the indigenous people. In this political environment, the idea of finding the right fit between people and technology could advance most development agendas. For those looking for either a rapid or gradual Europeanization of indigenous society, fit was essential to propel development forward because it enlisted people in the project and allowed change to happen. Those who hoped to define a society made up of complementary, but non-intersecting spheres of indigenous European production could cite the lack of fit as a reason to reject projects that seemed to encourage the indigenous people to work in direct competition with Europeans.

Studies of Indonesia's colonial history often point to hollowness in the promise of Ethical thinking (Ricklefs 2001). In many respects, those studies are right, as the colonizers actively repudiated many of the social and political reforms that had been intended to encourage a harmonious partnership between the colonial state and the indigenous people, including arrests, suppression of only-recently granted rights to free speech, and the rejection of calls for equality and real political representation. Yet viewed through the lens of technological development, certain aspects of Ethical idealism showed a vitality and persistence that continued to exert their influence long after the Ethical policies were gone.

Whether these colonial ideals did or did not translate into post-colonial politics and practice is a question that requires further investigation. This is particularly true with respect to the impressive body of knowledge that scientific and technical experts acquired regarding the ecological, social, and economic conditions on Java. How this knowledge did or did not get employed during Indonesia's later history of development, especially during the introduction of the Green Revolution is not yet clear. There are some hints, however, that colonial assumptions and beliefs didn't simply disappear. The Ethical insistence on contact between the indigenous people and representatives of the state made possible a corps of indigenous agriculture experts, many of whom carried their training in the "best practices" of development into the early development projects of the Republic of Indonesia. One American aid expert in the late 1950s remarked (in frustration) that the agriculture experts seemed very good at getting data, but didn't seem to know how to act on it.[1] For Americans, many of whom were embracing the ambition of large-scale modernization, the data-gathering that was a way of life for Indonesian agriculture experts might have seemed more like procrastination than the necessary groundwork for action that it was in the colonial tradition. At higher levels of government, some early leaders called for Indonesian development to proceed through cooperative, small-scale industry in contrast to Sukarno's more grandiose ideas, bringing the question of technological scale back into Indonesian politics.

Further investigation might also reveal substantive connections between colonial practice and present-day international development. Some Dutch experts, for example, took their knowledge and assumptions to aid projects throughout the world, particularly those sponsored by the United Nations and specialized agencies like the Food and Agriculture Organization. One prominent figure was Egbert de Vries, who started his career by writing a detailed agricultural economic analysis of the region around Pasuruan on Java in the 1920s and became a contributor to the neo-Ethicist publication *De Stuw* in the 1930s. After Indonesian independence, De Vries became deeply involved in international development and the United Nations. His publications show clearly the influence of his colonial training and convictions with regard to development (1948, 1961). Paying attention to the influence of experts like De Vries may help us better understand the long-term and multifaceted consequences of colonial development for the contemporary world.

Indeed, some readers may have noticed a similarity between the practices described in this history and those employed today in some international development programs. Many present-day development practitioners and theorists call for attention to local knowledge, as well as ecological and social conditions, in order to determine what kinds of change are most appropriate and helpful. They are often wary of projects that seem to poorly fit the character of local societies and prefer to aid bottom-up, grassroots projects with significant local support.[2] These practitioners are more likely to trace the roots of their practices to the fiercely anti-centralizing politics of Gandhi, or E. F. Schumaker's *Small is Beautiful* (1973), than to the colonial past. Yet in the Indies, the colonial state found its gold standard in small-scale, locally sensitive development. Elsewhere in the colonial world as well, detailed ecological knowledge played a significant role in colonial projects of social transformation, as both Helen Tilley (2003: 109-130) and Peder Anker (2001) have shown. It is easy, but incorrect, to assume, given the present-day politics of small-scale development, that all locally sensitive projects must reject centralized state control. To understand the political significance of scale in development, as well as the relative importance of small- and large-scale projects at different moments in history, it is crucial that we gain a more nuanced understand of the politics of technology in development, as it is embodied both in policy and on the ground in day-to-day practice. Small might be beautiful; at times, however, it has also been colonial.

Notes

Notes Introduction

1 In Dutch, the word seen most frequently is *ontwikkeling*.

2 In the Netherlands East Indies, the term Native was a legal category that denoted people considered indigenous to the islands. Those considered Chinese or other "foreign orientals," as well as Europeans, were excluded. "Native development" therefore was restricted to a subset, albeit a large one, of Indies society.

3 Attention from historians of science and technology and environmental historians has led to an increasingly rich literature on this subject since the 1980s. A few prominent examples of studies that focus on large infrastructural and education projects include Michael Adas, *Machines as the Measure of Men: Science, Technology, and Ideologies of Western Dominance*, Ithaca: Cornell University Press, 1989; Daniel Headrick, *Tentacles of Progress: Technology Transfer in the Age of Imperialism, 1850-1940*, New York: Oxford University Press, 1988; and David Arnold, *Science, Technology, and Medicine in Colonial India*, volume III of *The New Cambridge History of India*, Cambridge, U.K.: Cambridge University Press, 2000. *Technology and the Raj: Western Technology and Technical Transfers to India, 1700-1947*, Roy Macleod and Deepak Kumar (eds.), New Delhi: Sage Publications, 1995 has a selection of articles on this topic, including Ian Derbyshire, "The Building of India's Railways: The Application of Western Technology in the Colonial Periphery, 1850-1920"; Saroj Ghose, "Commercial Needs and Military Necessities: The Telegraph in India"; and Arun Kumar, "Colonial Requirements and Engineering Education." Kapil Raj briefly explores the British survey of India in, "Colonial Encounters and the Forging of New Knowledge and National Identities: Great Britain and India, 1760-1850," in *Nature and Empire: Science and the Colonial Enterprise*, Roy Macleod (ed.), OSIRIS, vol. 15, 2000. Because forestry projects were especially important for colonizers, there is a rich literature on efforts to transform forest use in colonies. See, for example, S. Ravi Rajan, *Modernizing Nature: Forestry and Imperial Eco-Development, 1800-1950*, Oxford: Oxford University Press, 2006. For Indonesia, see Nancy Peluso, *Rich Forests, Poor People: Resource Control and Resistance in Java*, Berkeley: University of California Press, 1992.

4 From the time that J. H. Boeke first started publishing on Indonesian economics and the dual economy, economic histories of Indonesia have flourished. It would be impossible to present a comprehensive review here, but a few scholars whose works have provided much of the economic context for this study include Peter Boomgaard (including *Children of the Colonial State: Population Growth and Economic Development in Java, 1795-1880*, Amsterdam: Free University Press: Centre for Asian

Studies Amsterdam, 1989, and his volumes of revisited Indonesian economic statistics, particularly *Changing Economy in Indonesia: A Selection of Statistical Source Material from the Early 19th Century up to 1940*, vol. 10, "Food Crops and Arable Lands, Java 1815-1942," Amsterdam: Royal Tropical Institute, 1990); Ann Booth (including *Agricultural Development in Indonesia*, Sydney Asian Studies Association: Allen and Unwin, 1988. *The Indonesian Economy in the Nineteenth and Twentieth Centuries: A History of Missed Opportunities*, New York: St. Martin's Press, 1998); and Pierre van der Eng (including *Agricultural Growth in Indonesia since 1880*, Groningen: Universiteitsdrukkerij Rijksuniversiteit Groningen, 1993).

Notes Chapter 1

1 It is unlikely the Dutch would have agreed with this assessment of their relationship with the Chinese and Arabs.

2 Here and throughout the text, translations from Dutch and Indonesian are by Suzanne Moon, unless otherwise indicated.

3 While the direct translation is clearly 'prosperity' according to the authoritative Van Dale Dutch-English dictionary, later works containing the word "*welvaart*" are frequently translated using the word "welfare," most prominently the 12-volume *Onderzoek naar de Mindere Welvaart der Inlandsche Bevolking op Java en Madoera*, Batavia: Kolff, 1904-1914, which is usually translated as: The Inquiry into the Declining Welfare of the Native People on Java and Madoera.

4 The focus on farmers to the exclusion of rural craftsmen, like cart wrights, potters, and other groups who might have benefited from the Cultivation System's increased demand for their goods is typical for colonial critics at the time. For more on the non-farm rural economy, see *In the Shadow of Agriculture: Non-farm Activities in the Javanese Economy, Past and Present*. Paul Alexander, Peter Boomgaard, and Ben White (eds.), Amsterdam: KIT, 1991.

5 J.E. Stokvis, paraphrased in *De Indische Gids*, vol. 40, no. 2, 1918, p. 1383. Original article appeared in *Koloniale Studiën* in June of that year. For a similar argument, see H. Tersteeg, "Practische Ethiek," *De Indische Gids*, vol. 40, no. 2, 1918.

6 See, for example, the discussion of Native agriculture in the *Onderzoek naar de Mindere Welvaart*, vol. 5, 12-14, *Melchior Treub, Schematische Nota over de Oprichting van een Agricultuur-departement in Nederlandsch-Indië*, Buitenzorg, 1902 (no publisher name given); Melchior Treub, Landbouw: January 1906-October 1909: *Beredeneerd Overzicht der Verrichtingen en Bemoeiingen met het Oog op de Praktijk van Land-, Tuin, en Boschbouw, Veeteelt, Visscherij en Aanverwante Aangelegenheden*, Amsterdam: Scheltema & Holkema, 1910, 27-28. For similar projects elsewhere in the world see, for example, Zaheer Baber, *The Science of Empire: Scientific Knowledge, Civilization, and Colonial Rule in India*, Albany: SUNY Press, 1996, 213-20; and Ronald Kline, *Consumers in the Country: Technology and Social Change in Rural America*, Baltimore: Johns Hopkins University Press, 2000. For a brief overview of tractorization projects in Soviet Russia, see James Scott, *Seeing Like a State*. I do not know whether you need the full cite here because you referenced it in the introduction.

7 For a recent analysis of food supply and population in the Indies, see Boomgaard, *Children of the Colonial State*; and Boomgaard and Van Zanden, *Changing Economy in Indonesia*, vol. 10, "Food Crops and Arable Lands, Java 1815-1942."

8 Dutch observers often pointed to the Javanese practice of dividing land among all male children as a contributing factor to the problem. With fewer uncultivated hectares available, farm families had to settle for subdividing their existing land into smaller and smaller units.

Notes Chapter 2

1 For histories of colonial irrigation written during the colonial era, see R. A. van Sandick, "Irrigatie op Java," in *Voordrachten over Koloniale Onderwerpen*, Deventer, 1913; C. W. Weijs, "*Schets van de Ontwikkeling van Technische Bemoienis met Irrigatie in Indië*," a speech given at the *Technische Hoogeschool* in Delft, 1913.

2 Within Southeast Asia, for example, British Malaya had Departments of Health and Chemistry by the late 1890s. The United States, Great Britain, Germany, and the Netherlands, to name a few, all had made a place for technical experts within government departments by the early-twentieth century.

3 The pamphlet is not signed, but credit is given to "the Assistant for Rice-Culture in the district of Keboemen, Gaade."

4 The process described here is a generalization of practices used in agricultural extension in the United States and elsewhere. See Roy V. Scott, *The Reluctant Farmer: The Rise of Agricultural Extension to 1914*, Urbana: University of Illinois Press, 1970; and Wayne D. Rasmussen, *Taking the University to the People: Seventy-Five Years of Cooperative Extension*, Ames: Iowa State University Press, 1989.

5 Treub's impression of farmers' resistance to education may superficially resemble similar resistance by U.S. farmers to education. See David B. Danbom, *Born in the Country: A History of Rural America*, Baltimore: The Johns Hopkins University Press, 1995. However, Treub saw indigenous farmers' resistance to education stemming primarily from economic circumstances – poverty and the desire to get a good payoff on education--rather than a resistance to agricultural education per se.

6 I don't wish to suggest that language problems alone are insurmountable. The Japanese for instance, promoted the study of foreign languages like English and French during the Meiji period, in order to smooth the introduction of new technologies. See Tessa Morris-Suzuki, *The Technological Transformation of Japan: From the Seventeenth to the Twenty-First Century*, Cambridge: Cambridge University Press, 1994. Nevertheless, the number of different languages the Dutch might encounter on all the islands extended into the hundreds, and Dutch authorities had long considered elementary Dutch language education in the Indies as expensive and impractical for the lower classes.

7 These private estates were lands owned primarily by Europeans (whose ownership rights had survived the reforms of the 1870s) and had long produced rice for export to Europe. The rice they produced was expensive and often not to the taste of the Javanese.

Notes Chapter 3

1 It should be noted that other kinds of technological development initiatives were going on at roughly the same time in the area of small-craft production. These received a much smaller portion of the colonial budget, as well as less attention from the colonial press.

2 See, for example, J. J. Paerels, *De Rijst*, vol. 5 of *Onze Koloniale Landbouw: Twaalf Populaire Handboekjes over Nederl-Indische Landbouw-Producten* (Dr. J. Dekker, ed.), H. D. Tjeenk Willink & Zoon: Haarlem, 1916; J. van Breda de Haan, *Rijstteelt in Nederlandsch-Indië*, Baarn: Hollandia-Drukkerij, 1916; and H. C. H. de Bie, *Landbouw der Inlandsche Bevolking op Java*, Batavia: G. Kolff & Co., 1902. See also "De Inlandsche Landbouw," a multipart article in *Het Algemeen Landbouwweekblad voor Nederlandsch-Indië*, March 27, 1926 - May 1, 1926. The source of this article was "*Mededeelingen der Regeering omtrent enkele onderwerpen van Algemeene Belang*" with an unspecified author.

3 While the reforms of the 1870s were intended to eradicate communal ownership, the actual process of changing land ownership happened very gradually. See J. S. Furnivall, *Netherlands India.*

4 A description of the Department's methods for line selection appears in the *Verslag Landbouwvoorlichtingsdienst*, 1912, bijlagen 2. For some regional details on work performed during the period of interest in this chapter, see *Jaarboek van het Departement van Landbouw*, Weltevreden, 1905-1910; *Jaarboek van het Departement van Landbouw, Nijverheid, en Handel*, Weltevreden, 1911-1929; and *Verslag Landbouwvoorlichtingsdienst*, Weltevreden, 1912-1917. Lovink backed the importance of improving seed in a proposal to the Governor-General for the creation of seed gardens in the Indies. Director of Department of Agriculture Industry and Trade (Lovink) to the Governor-General (Idenburg), 12, August 1912, in Verbaal 22 1913, no. 26, The Nationaal Archief, The Hague, The Netherlands.

5 For more on Dutch agricultural science, see Jan Bieleman, *Geschiedenis van de Landbouw in Nederland, 1500-1950*. On German agricultural extension, see, for example, Klaus Herrmann and Harald Winkel, *Vom "belehrten" Bauern: Kommunikation und Information in der Landwirtschaft vom Bauernkalender bis zur EDV*, St. Katharinen: Scripta Mercaturae, 1992. On the history of German agricultural science, see John A. Perkins, "The Ag Rev in Germany, 1850-1914," *Journal of European Economic History* vol. 10 (1981):71-118; Volker Klemm, *Agrarwissenschaften in Deutshcland*, Scripta Verlag, 1992.

6 I am indebted to Dr. Hille Toxopeus for first pointing out to me the particular character of Dutch *proefvelden*.

7 A picol is approximately 61.76 kg.

8 Choosing farmers in the regions around the seed garden would help prevent spontaneous hybridization, as the rice grown in the whole complex of seed garden and private fields would all be the same variety.

9 See, for instance, the reports from the Sidoarjo seed garden, *Verslag, Landbouwvoorlichtingsdienst*, 1913, 10, and from the Ngandjoek seed garden, *Verslag, Landbouwvoorlichtingsdienst*, 1914, 244. A *selamatan* is a festive gathering, often with religious or spiritual underpinnings, such as a *selamatan*

held for an engagement, wedding, or funeral. See Koentjaraningrat, *Javanese Culture*, Singapore: Oxford University Press, 1985.

10 For examples of negative comments on Skrivimankotti, see *Verslag Landbouwvoorlichtingsdienst*, 1912, 98 (report from Madiun/Kediri district), 1914, 52 (report from Cheribon district), and 111 (report from Yogyakarta, Surakarta district).

11 For example, see reports on efforts to introduce Skrivimankotti in the Rembang, Semarang, Pasoeroean Semarang districts in *Jaarverslag van den Landbouwvoorlichtingsdienst*, 1922, 36, 67, 105-106, 117; *Verslag Landbouwvoorlichtingsdienst*, 1925, 53-61, 152; and *Afdeeling Landbouw, Verslag* 1926, 35-72, 171-179.

Notes Chapter 4

1 The official goals and regulations regarding the *Volksraad* can be found in the *Regeerings Almanak*, Batavia, 1918, 50-60. For a general historical discussion, see Ricklefs, *A History of Modern Indonesia*.

2 I have found no evidence that anyone promoted mechanized farms as a way of developing the skills of workers. While workers would certainly need new skills to work such a farm, no one seems to have used this to justify mechanization.

3 See, for example, the pro-machine rhetoric in L. W. Ellis and Edward Rumely, *Power and the Plow*, Garden City: Doubleday, 1911. See also, for historical perspectives on mechanization in American agriculture, Wayne D. Rasmussen, "The Impact of Technological Change on American Agriculture, 1862-1962," *Journal of Economic History*, vol. 22 (Dec. 1962); Reynold M. Wik, *Steam Power on the American Farm*, Philadelphia: University of Pennsylvania Press, 1953; and Robert C. Williams, *Fordson, Farmall, and Poppin' Johnny: A History of the Farm Tractor and its Impact on America*, Urbana: University of Illinois Press, 1987.

4 Sibinga Mulder does not say in his memo why exactly he was in San Francisco, but he may have met Ray at the Panama-Pacific International Exposition held in San Francisco in 1915, as the Indies' government had created a special committee to organize their participation in this event and sent a large delegation. The Netherlands East Indian-San Francisco Committee (as it was called) produced a series of 15 booklets promoting investment in the Netherlands Indies for distribution at the exposition. For more on such expositions, see Robert Rydell, *All the World's a Fair*, Chicago: University of Chicago Press, 1984.

5 For other optimistic readings of Selatdjaran, see also, D. W. N. de Boer, "*De Economische Opheffing van den Inlander, op Landbouwkundig Gebied, Speciaal in de Buitengewesten*," *Koloniaal Tijdschrift*, April, vol. 10, 1921; D. Broersma, "De proeven te Selatdjaran," Reprinted from *De Locomotief in Algemeen Landbouw Weekblad*, 12 August 1921, and for a somewhat less warm, but still positive reading, see "Selatdjaran," *Algemeen Landbouw Weekblad*, 6 October 1922.

6 For more on agricultural colonization, see K. Pelzer, *Pioneer Settlements in the Asiatic Tropics: Studies in Land Utilization and Agricultural Colonization in Southeastern Asia*, New York: American Geographical Society, 1948; A. Perk, *De Javanen Kolonisatie in de Lampongsche Districten (Zuid Sumatra):*

gedurende de periode 1903-1941, Wageningen: Afdeeling. *Sociologie der niet-Westerse Gebieden*, 1963; Joan Hardjono, *Transmigrasi dari Kolonisasi sampai Swakarsa*, Jakarta: Gramedia untuk Yayasan Obor Indonesia, 1982; and *Sepuluh Windhu Transmigrasi di Indonesia, 1905-1985*, Sri-Edi Swasono and Masri Singarimbun (eds.), Jakarta: Penerbit Universitas Indonesia, 1985. For analyses from the time, see, for example, W. C. Schalkwijk, "*De Kolonisatieproeven in de Lampongsche Districten*," *Koloniale Studiën*, vol. 2, pt. 2, 1917-1918, 415.

Notes Chapter 5

1 See *Regeerings-almanak* 1915-1920 for staffing lists of the Department. For a discussion of staffing problems among experiment station personnel, see the *Jaarboek van het Departement van Landbouw*, Batavia, 1919, 191-192. The probable reporter was E. J. C. Mohr, head of the General Experiment Station.

2 This term seems to derive from Marx's historical materialism, although it is difficult to say for sure because Boeke does not take up Marx's theories in his analysis.

3 The field of agricultural economics had arisen in the United States and Europe, largely in response to agricultural "panics" and depressions, especially the agricultural depression of the 1890s. During such panics, steeply declining farm prices had destroyed the livelihoods of farmers whose production had expanded. In the Indies, the Department of Agriculture established the first sub-department for agricultural economics in 1918, but it did not at first look at indigenous agriculture, focusing instead on the economics of plantations in Sumatra. *Jaarboek van het Departement van Landbouw, Nijverheid, en Handel*, 1919, Weltevreden, 1920, 118.

4 The Statistical Bureau was intended to regularize the statistics on Native agriculture (the basis for government taxation of farmers) by putting the work of estimation in the hands of experts on agriculture and statistics, and removing it from the control of the *Binnenlands Bestuur*. See *Jaarboek van het Departement van Landbouw, Nijverheid, en Handel, 1920*, Weltevreden, 1921, 96.

5 One example of such an analysis is Egbert de Vries, *Landbouw en Welvaart in het Regentschap Pasoeroean: Bijdrage tot de Kennis van de Sociale Economie van Java*, dissertation, Wageningen, 1931.

Notes Chapter 6

1 It is possible to use fear and coercion to force agricultural producers to comply with governments, of course. The Indonesian government made adoption of green revolution varieties mandatory for rice farmers in the 1960s.

2 See early statements in *Jaarverslag van den Landbouwvoorlichtingsdienst over 1919*, Weltevreden, 1920, v-vi, and later statements showing the implementation of this policy, for example, in *Jaarverslag van den Landbouwvoorlichtingsdienst over 1922*, Weltevreden, 1923, 87; Jaarverslag van den Landbouwvoorlichtingsdienst over 1923, Weltevreden, 1924, 152-157; and *Jaarverslag van den Landbouwvoorlichtingsdienst over 1924*, Weltevreden, 1925, 206.

3 See, for example, Van Doorn, *De Laatste Eeuw van Indië*; Booth, *Agricultural Development in Indonesia*; Booth, *The Indonesian Economy in the Nineteenth and Twentieth Centuries*; and Van der Eng, *Agricultural Growth in Indonesia since 1880*.

4 It may also have been a play on words because perdata also means judgment--a not inconvenient meaning for a group that presented itself as representing a thoughtful, middle-ground alternative to radical politicians.

5 Copies of all documents between multiple correspondents can be found in Mailrapport 4066/1922, documents dated from May through November 1922, the *Nationaal Archief*, The Hague, The Netherlands.

Notes Chapter 7

1 Assuming Luytjes's estimate was accurate, this suggests that activists who had called for just such a move during World War I were much less wrong-headed than their critics had claimed.

2 Also see official discussion of this issue in mailrapport 462x/1926, the Nationaal Archief, The Hague, The Netherlands.

3 See, for example, T. A. Fruin, "*Ontwerp-Welvaartsprogram*', *De Stuw*, 15 August 1930, 13; Th. A. Fruin, "Rationeele Bezuinigingspolitiek'; T. van der Ploeg, "*Intensivieering van den Inheemschen Landbouw als Middel tot Verhooging der Volkswelvaart*," *De Stuw*, 15 Oct. 1930, 5-8.

4 Ravesteijn, *De Zegenrijke Heeren van Wateren*, especially 243-324. See also an anonymous, untitled report in *Economisch Weekblad voor Nederlandsch-Indie*, 4 August 1933, 170-171. A. J. Koens questioned the Department of Public Works' claims in "*Intensiveering van rijstbouw in Nederlandsch-Indie*," *De Indische Gids*, vol. 55 (1934), 229-236.

5 Also see the untitled report in *Economisch Weekblad voor Nederlandsch-Indie*, 4 August 1933, 170-171.

Notes Conclusion

1 This comment arose in the context of an American aid mission to Indonesia operated by the United States Technical Cooperation Administration. James Baird, Correspondence in 1956 related to agricultural extension. Record Group (RG) 469 (Records of U.S. Foreign Assistance Agencies), Office of Far East Operations, Indonesian Subject Files 1953-1959, Box 48, U.S. National Archives, Washington D.C.

2 A few recent examples of this kind of work include David Mosse, *Cultivating Development: An Ethnography of Aid Policy and Practice; Pro-poor Growth and Governance in South Asia: Decentralization and Participatory Development*, Ponna Wignaraja and Sushil Sirivardana (eds.); and *Development Encounters: Sites of Participation and Knowledge*, Pauline E. Peters (ed.).

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Technology and Ethical Idealism investigates a pivotal intellectual and political moment in twentieth-century Indonesian history, the establishment of "development" as both an ideal and a practice. The focus of this study is on technological development as a central concern of colonial political life from 1900 to 1942 in the Netherlands East Indies. The foundations of developmentalist thinking and practice in the turn-of-the-century colonial reforms were called the Ethical policies. Tracing the interplay of Ethical politics at the highest levels of the Netherlands Indies colonial government with the technical practices of development taking place in the fields of ordinary Javanese farmers, it shows how and why technological development became such an enduring part of political and material life in the archipelago.

This study offers a new history of the Ethical policies that focuses on their often-neglected technopolitical character, and the formative influence they exercised on development thinking in Indonesia among both Dutch experts and members of the community of Indonesian activists known as the *pergerakan*. In startling contrast with many histories of development, it shows how the interaction of colonial idealism and scientific practice led the Dutch to commit to small-scale change in their "development of the native peoples." As experts tailored technical solutions to ecological, social, and economic conditions of local areas, they eschewed high modernism in their search for colonial modernization, unexpectedly prefiguring the appropriate technology movements that arose decades later.

Based on extensive research in the colonial archives in The Hague, the National Library in Jakarta, and the Bogor Library of Biology and Agriculture, this study draws on official documents and scientific research of the era, as well as public discussions in both Dutch and Indonesian language newspapers and journals in order to capture not just the official plans, but also a wide range of public critiques and responses to development, and the day-to-day practices that shaped the productive lives of ordinary farmers. Offering a new exploration of politics and technology in colonial Indonesia, this book will interest historians of Indonesia and Southeast Asia, historians of technology, and those seeking to understand the complex colonial roots of international development.

Suzanne Moon is an Assistant Professor in the History of Science at the University of Oklahoma. She received her Ph.D. in Science and Technology Studies from Cornell University, where she also studied in the Southeast Asia Program.

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