



The Role of Multinational Corporations in the Green Revolution, 1960s and 1970s

by

Karin Bugow

a Thesis submitted in partial fulfillment
of the requirements for the degree of

**Doctor of Philosophy
in History**

Approved Dissertation Committee:

Prof. Dr. Corinna Ruth Unger
European University Institute, Florence

Prof. Dr. Marc Frey
Bundeswehr Universität, München

Prof. Dr. Jonathan Harwood
Kings College, London/ University of Manchester

Date of Defense: March 6, 2020

Department of Social Sciences and Humanities

I. STATUTORY DECLARATION

Family Name, Given/First Name:
Matriculationnumber:
Kind of thesis:

Bugow, Karin
20331412
PhD-Thesis

DECLARATION OF AUTHORSHIP

I hereby declare that the thesis submitted was created and written solely by myself without any external support. Any sources, direct or indirect, are marked as such. I am aware of the fact that the contents of the thesis in digital form may be revised with regard to usage of unauthorized aid as well as whether the whole or parts of it may be identified as plagiarism. I do agree my work to be entered into a database for it to be compared with existing sources, where it will remain in order to enable further comparisons with future theses. This does not grant any rights of reproduction and usage, however. The Thesis has been written independently and has not been submitted at any other university for the conferral of a PhD degree; neither has the thesis been previously published in full.

ERKLÄRUNG DER AUTORENSCHAFT (URHEBERSCHAFT)

Ich erkläre hiermit, dass die vorliegende Arbeit ohne fremde Hilfe ausschließlich von mir erstellt und geschrieben worden ist. Jedwede verwendeten Quellen, direkter oder indirekter Art, sind als solche kenntlich gemacht worden. Mir ist die Tatsache bewusst, dass der Inhalt der Thesis in digitaler Form geprüft werden kann im Hinblick darauf, ob es sich ganz oder in Teilen um ein Plagiat handelt. Ich bin damit einverstanden, dass meine Arbeit in einer Datenbank eingegeben werden kann, um mit bereits bestehenden Quellen verglichen zu werden und dort auch verbleibt, um mit zukünftigen Arbeiten verglichen werden zu können. Dies berechtigt jedoch nicht zur Verwendung oder Vervielfältigung. Diese Arbeit wurde in der vorliegenden Form weder einer anderen Prüfungsbehörde vorgelegt noch wurde das Gesamtdokument bisher veröffentlicht.

.....
Date, Signature

II. ABSTRACT

This dissertation examines the role of multinational corporations in the Green Revolution of the 1960s and 1970s—understood as a technocratic and commercial approach to rural development, based on a package of agricultural inputs comprised of high-yielding seed varieties, fertilizers, and plant protection chemicals. It poses the following research questions: In which ways did multinational corporations participate in the Green Revolution? How did they influence the rural development agendas of their home countries, international organizations, and governments in the Global South? Chapter 1 discusses the literature on the history of the Green Revolution and introduces the research methods. The analysis is structured around the Green Revolution package: seed, fertilizer, and plant protection chemicals. Chapter 2 examines a philanthropic-government-corporate network that disseminated hybrid maize seeds in the early 1960s in India. Chapter 3 analyzes the interrelationship of development aid and the fertilizer industry in India, and the role of multinational corporations in the development of this industry. Chapter 4 focusses on public-private partnerships in the dissemination of plant protection chemicals and discusses the cooperation of multinational corporations with international organizations, their governments, and governments in so-called developing countries, using the example of the Bimas Gotong Royong project in Indonesia. Chapter 5 shifts the analytical focus to the 1970s, examining the transition from the Green Revolution to the Gene Revolution. It shows how the decision of chemical corporations to invest in the seed business was a counter-reaction to rising environmental and leftist criticism, and assesses the significance of these changes in terms of the larger history of rural development. Chapter 6 concludes that multinational corporations changed their behavior from initially hesitant actors to a more proactive force in the Green Revolution and beyond. Multinational corporations were indispensable partners in the Green Revolution, due to their know-how in the production and dissemination of agrichemicals and the increasingly commercial logic of rural development strategies. Meanwhile, multinational corporations were dependent on support from, and partnerships with, the development community when it came to expanding their markets to so-called developing countries and turning rural development into a profitable business.

III. TABLE OF CONTENTS

I. Statutory Declaration.....	i
II. Abstract.....	iii
III. Table of Contents	v
IV. Table of Figures.....	vii
V. List of Abbreviations.....	ix
VI. Acknowledgements.....	xi
Introduction	1
A brief literature review	9
Research approach: seeing the ‘Green Revolution’ through a corporate lens	23
Structure: Bundling the Green Revolution package.....	30
Methodological considerations	34
Sowing the Green Revolution in India (1957-1967)	37
Historical context	38
Establishment of a private seed industry in India, (1956–1967).....	46
DeKalb in India, (1960–1967)	56
Implications for understanding the Green Revolution	67
Conclusion: A philanthropic-government-corporate network	70
Fertilizing the Green Revolution in India (1955-70).....	75
The Development of the fertilizer industry in India in the early twentieth century	79
Uhde’s fertilizer factory as part of the Rourkela steel works, (1955–63)	82
The Bechtel consortium and international pressures to strengthen the private sector in fertilizer production, (1963–1970).....	89
Indian fertilizer policies in the late 1960s	93
Technological spill-over effects in the construction of fertilizer plants.....	100
Conclusion.....	102
Diffusing Pesticides in the Framework of Development Aid (1965–1970).....	106
Case I: The Industry Cooperative Programme, (1965–78)	108
Case II: The Agribusiness Council, Inc., (1967- today).....	118
Case III: The Bimas Gotong Royong project in Java, Indonesia, (1965– 1967)	124
Conclusion.....	142
Gaining influence from the Green to the Gene Revolution in the 1970s.....	145
Criticism of multinational companies in the late 1960s and 1970s.....	147
Counter-strategies of multinational corporations in the 1970s	157
From the Green to the Gene Revolution: corporate dominance in biotechnological research.....	167
Conclusion.....	170
Conclusion.....	176

TABLE OF CONTENTS

Summary	177
Continuities in approaches to rural development.....	184
The Green Revolution through a corporate lens	185
Multinational corporations and the free market	186
Mutual dependencies of rural development actors in the Green Revolution	187
Critical assessment	189
Outlook.....	191
Bibliography	194
Primary Literature	194
Secondary Literature	197
List of Archives.....	205
List of publications and conference contributions	208

IV. TABLE OF FIGURES

Figure 1 The technologies of the ‘Green Revolution’ as a package of interdependent inputs	17
Figure 2 Global Agrifood Supply Chain (Inspired by Hendrickson et al., 2017; p. 13).....	26
Figure 3 Foodgrain production vs. fertilizer consumption (1980), graph published by the Fertilizer Association of India (Alexander, 1980; 42).....	76
Figure 4 CIBA Pilatus Aircraft presented close to a village in Java, Indonesia. Photograph taken by Uwe H. Preuss (Archival Collection Ciba-Geigy).....	125
Figure 5 CIBA Pilatus Porter flying over the fields of Java/ Spraying aperture (undated). Photograph taken by Uwe H. Preuss (Archival Collection of Ciba-Geigy).....	135
Figure 6 Government officials weigh Rice Bushels. Ciba employees observe the process from the background. Photograph taken by Uwe H. Preuss (Archival Collection of Ciba-Geigy)	137
Figure 7 Military protecting the delivery of fertilizers to the villages. Photograph taken by Uwe H. Preuss (Archival Collection of Ciba-Geigy)	138

V. LIST OF ABBREVIATIONS

AGRA	Alliance for an African Green Revolution
CDP	Community Development Programme
CIA	Central Intelligence Agency
CYMMIT	Centro Internacional de Mejoramiento de Maíz y Trigo
DeKalb	DeKalb Genetics Corporation
DLF	Development Loan Fund
FAO	Food and Agriculture Organization
G-77	Group of 77
GOI	Government of India
HYVs	High-yielding varieties
IADP	Indian Agricultural District Programme
IARI	Indian Agricultural Research Institute
IBEC	International Basic Economy Corporation
IBRD	International Bank of Reconstruction and Development
ICP	Industry Cooperative Programme
IIAP	Indian Intensive Agricultural Programme
IRRI	International Rice Research Institute
NIEO	New International Economic Order
PL 480	Public Law 480
PPPs	Public-Private Partnerships
PR	Public Relations
RG	Record Group
UN	United Nations

LIST OF ABBREVIATIONS

UNIDO	United Nations Industrial Development Organization
UNEP	United Nations Environment Program
US	United States (of America)
US AID	United States Agency for International Development

VI. ACKNOWLEDGEMENTS

This project would not have been possible without the steadfast support and keen criticism of my supervisors Corinna Unger and Marc Frey. They drafted the project's foundation and inspired the design of the research approach from scratch. I am very grateful for their personal and academic advice and care, which reached far beyond the usual extent of academic supervision. Despite the long distances between our workplaces, in the course of the last years, they opened uncountable doors for me to set up a research network, trips, and fruitful research environments. Corinna's incomparable patience and thoroughness in proofreading drafts and pieces and her continuous Socratic questioning of my structure and arguments helped me to bring my fragmented thoughts and ideas to paper. Marc's paradoxical intervention in the beginning of the thesis (that this thesis does not need to be completed) relieved me of a great weight and cleared the way to finish this piece of writing.

This research is part of a larger project on *The International History of Rural Development after 1950*, generously funded by the Volkswagen Foundation. Without the funding of the foundation, this research would have been impossible. My special thanks goes to Johanna Brumberg who, through the Volkswagen Foundation, was a reliable and uncommonly friendly support throughout the project. The Rockefeller Archive Center, the Hagley Library, and the History of Science Foundation made further important financial contributions to this research.

My colleagues Verena Kröss, Aliya Tonkobayeva, Dienabou Berry, and Smriti Sharma were a source of inspiration and support. Smriti generously opened her ears and kitchen to discuss various problems within and beyond the project. Dienabou's dedication to her research and willpower were a great inspiration. Aliya's incredible optimism and warm heartedness helped me to keep up my good spirits and Verena Kröss was an irreplaceable help on the last meters of this marathon. In Jacobs University, I found ideal working conditions for my research. The academic and office team, especially Ronald Kieschnick, reliably supported my numerous inquiries for extensive research trips and supplies. My research brought me to various archives in Germany, Switzerland, Italy, and the United States and, although my findings were not

ACKNOWLEDGEMENTS

always fruitful, the generous support I experienced in the archives was an indispensable source of motivation.

My special thanks goes to Martina Stähli of the Archiv für Zeitgeschichte for her quick replies, Susanne Witschaß-Beyer and her creativity in the Archiv des Bundes der deutschen Industrie, Michael Roos to help me orient in the vast Bundesarchiv, Lysann Goldbach of the Kreditanstalt für Wiederaufbau Bank Archiv, and the spontaneous support of David Langbart in the US National Archives, Washington, DC. In the European University Institute and the European Archives, I found an ideal writing environment for a part of this thesis. The Hagley Library offered the most memorable experience of working in an archive. I enjoyed the long walks over the beautiful DuPont property, profited from long discussions with Roger Horowitz, and was incredibly thankful for every croissant and coffee from Dan Caso. I thank Fabio Ciccarello for his patience in directing me through the archival collection of the Food and Agriculture Organization in Rome and Lee R. Hiltzik for his generous support in the Rockefeller Archive Center. The discussions with Tom Rosenbaum over lunch and his curiosity were a great motivation and source of inspiration. My sincere gratitude goes to Florence Wicker, Philip Gafner, and Carina Bucher of the Novartis Archive, who did not only welcome me in Basel as a researcher but also as a friend. Their outstanding support helped me to find the most valuable material of my research. During my archival research, *inter alia* in Basel, I crossed paths with Paul Turberg several times, who generously shared his research interest and material with me. The (socially adequate) occasions to discuss at length about the history of multinationals are rare. Therefore, I am thankful for the encouraging discussions with and interest of Jonathan Harwood in this work.

My friend Leo Keilmann and my brother Stefan Bugow helped me with the technical organization and management of my (extensive) research material and sustained my moodiness with it. The writing process was not like a walk on a sunny afternoon and I am very thankful for their and my flat mates Verena Zimmermann and Claire Samtleben's support and patience with my changing attitudes. My friends Magdalena Fricke and Vincenz Pieper were great companions for the library; Judith Dreiling was always only one call away when I needed (cake) support, my friend Helena Piontek brought fresh perspectives, Angela Osthoff great academic

ACKNOWLEDGEMENTS

inspiration, and Elena Ammel a beautiful home. I could not be more grateful to Rose Fricke for providing a calm writing sanctuary, when urgently needed.

My friend Timea Kasa helped me a lot with language editing, as did my husband Henry Finch. My gratitude goes to Maurice Hutton, who worked with great dedication and thoroughness on the language of this thesis. The greatest source of motivation was my family: especially my father Rainer Bugow, who continuously asked about the progress of the work and believed in me finishing it; my mother Sabine Bugow, who supported me throughout my studies; my grandmothers Hannelore Heering and Margrit Bugow, who always had an open ear, as did my aunt Kerstin Bugow. And my husband Henry, my greatest inspiration. And Toula, there you are.

CHAPTER I

INTRODUCTION

The Green Revolution [...] is creative and is making a major contribution to man's most aggravating problems. It expresses the best of the Nation. [...] it expresses its creative genius [...] as the result of a productive interplay between science, private foundations, legislation of this congress, industry, and educational institutions.¹

In this statement in 1969, Charles S. Dennison, then Vice-President of the International Minerals & Chemical Corporation², asserted that the Green Revolution brings out the best of the United States and—through the cooperation between state and private actors—would contribute to the world's 'fight against hunger and poverty'. His patriotic praise echoed in the halls of the United States (US) House of Representatives to much applause. On this day, December 5, 1969, the Green Revolution was discussed in the Subcommittee on National Security Policy and Scientific Developments of the Committee on Foreign Affairs—a complicated name for a one-day symposium whose short title, 'Green Revolution', many participants took literally, choosing to wear green jackets and ties.

The Green Revolution had not yet become a commonplace concept in the development discourse: only in 1968, William S. Gaud, an administrator of the United States Agency for International Development (US AID), chose the name, 'Green Revolution', in contrast to the 'violent' socialist red revolution, for an approach to fight poverty by increasing agricultural productivity based on technologies and science.³ Thus, the term 'Green Revolution' referred to

¹ Charles S. Dennison, in: US Government Printing Office, "The Green Revolution. Symposium on Science and Foreign Policy," 12.5.1969, Folder 655, Box 26, International Basic Economy Corporation (IBEC), Rockefeller Archive Center, Sleepy Hollow, New York (NY): 117.

² The revenue of the International Mineral & Chemical Corp. grew from US\$130 million in the beginning of the 1960s to US\$2.2 billion in 2002. In 2004, the corporation merged with the nutrition division of the grain trader Cargill, Inc. to form The Mosaic Company. "International Minerals & Chemical Corp.," The Electronic Encyclopedia of Chicago, Chicago History Society, last modified 2005, accessed 10.15.2019, <http://www.encyclopedia.chicagohistory.org/pages/2724.html>.

³ The origins of the term 'Green Revolution' tell much about its historical context in the Cold War. As a reaction to impressive relative growth rates in India, William S. Gaud used a geopolitical color-coding scheme to contrast the 'green' technological transformation in agriculture introduced by the United States to the socialist "Red Revolution". He said: "Record yields, harvests of unprecedented size and

CHAPTER I

an approach to rural development in the Global South.⁴ The Green Revolution as an approach to rural development promoted a package of technologies—including high-yielding varieties for rice, wheat, and maize, in combination with chemical fertilizers, plant protection chemicals, irrigation, and credits. Scientists and development agents developed this approach with a technocratic conviction that technologies can solve political problems. In their view, using technologies to increase agricultural productivity was an adequate means to fight poverty and hunger. Yet this approach did not take into account that hunger and poverty were not only the result of an insufficient supply of staple grains but caused by a myriad of political and social parameters. Consequently, the package of intensive agricultural technologies and practices increased social inequalities in many rural areas, with severe political implications such as violent conflicts.

The Green Revolution was an important response to a scenario in which leading policy-makers feared that the growing world population could soon no longer be fed. The publication of discourse-dominating books such as ecologist William Vogt's *Road to Survival* (1949) mirrored the emergence of neo-Malthusian fears.⁵ In the late 1960s and early 1970s, books that promoted similar ideas, such as William and Paul Paddock's *Famine—1975!* (1965), and biologist Paul

crops now in the ground demonstrate that throughout much of the developing world—and particularly in Asia—we are on the verge of an agricultural revolution.[...] These and other developments in the field of agriculture contain the makings of a new revolution. It is not a violent Red Revolution like that of the Soviets, nor is it a White Revolution like that of the Shah of Iran. I call it the Green Revolution.” William S. Gaud, “The Green Revolution: Accomplishments and Apprehensions,” 03.08.1968, Washington, D.C., accessed 10.18.2019, <http://www.agbioworld.org/biotech-info/topics/borlaug/borlaug-green.html>.

⁴ The term ‘Global South’ emerged in the field of postcolonial studies as a counterweight to the usage of descriptors such as “developing countries,” or “less-developed countries.” The use of the term “developing” has frequently been criticized for its hegemonic and Eurocentric notion. By using the adjective “developing” to describe the state a country is in, one refers to a desirable final state that is most often oriented at a Western version of a liberal state capitalism. However, the usage of all these terms is questionable because they lump together a diversity of countries with different historical realities. Although the criticism of the term is convincing, this dissertation analyzes approaches to ‘development’ in their larger historical context, which would be difficult without using the term. In order to mark my personal distance to using the term developing countries, it is marked with the byword ‘so-called’.

⁵ William Vogt and Bernard M. Baruch, *Road to Survival* (Whitefish: Kessinger, 1948).

R. Ehrlich's *Population Bomb* (1971), turned into bestsellers.⁶⁷ Neo-Malthusian ideas had a major political impact and helped to negatively frame population growth in the Global South as a global problem and danger.⁸ They informed what historian Marc Frey described as a transnational “epistemic community”. This community, “[...] held together by a shared set of values and norms as well as policy recommendations, convinced international agencies and national governments to take action on the ‘problem’ of national and global populations.”⁹ This Western-influenced ‘epistemic community’ included but was not limited to philanthropic foundations, political elites, and social scientists. Often, it gave priority to preventing birth to hinder further population growth in global birth control programs. Therefore, it was “more focused on reducing the number of poor instead of reducing poverty.”¹⁰

The Green Revolution took another route. Supporters of the Green Revolution ushered in an optimism that the world could be fed. They strongly supported research and technology transfers to fight hunger and poverty in rural areas. Multinational corporations were part of this ‘epistemic community’, presenting themselves and their technologies as powerful combatants in the ‘fight against hunger’. The quote of economic analyst Eldridge Haynes, President of the Business International Corporation, gives an example for this:

“There is no hope of the world being properly fed in the foreseeable future unless private industry in the United States and in Europe moves into the developing countries

⁶ Paul Ralph Ehrlich, *The Population Bomb* (Cutchogue, N.Y.: Buccaneer Books, 1971).

⁷ William Paddock and Paul Paddock, *Famine—1975? America's Decision: Who Will Survive?* (Boston: Little Brown, 1967).

⁸ The reasoning of these authors was similar to the hypotheses of the 18th century British economist and clergyman Thomas Malthus. It is therefore classified as being ‘neo-Malthusian’. In short, Malthus assumed that poverty and hunger were the result of different growth rates of population and food production. As linear increases in food production could not keep up with exponentially increasing population growth, he described a constant threat of scarcity. Thomas Robert Malthus, *An Essay on the Principles of Population* (Cambridge: Cambridge University Press, 1990 [1803]).

⁹ Marc Frey, “Neo-Malthusianism and development: shifting interpretations of a contested paradigm,” *Journal of Global History* 6, no. 1 (2011): 77.

¹⁰ Ibid.

CHAPTER I

on a much larger scale than heretofore to manufacture fertilizers, agricultural chemicals, farm, and food processing equipment and materials [...].”¹¹

In the same spirit, the 1969 symposium “Green Revolution” demonstrated how US foreign policy in the 1960s trusted and promoted technologies to solve world problems. The Green Revolution offered a model to foreign policy-makers to initiate economic development with the help of the latest technologies, also in agriculture. Charles Dennison, an experienced consultant, knew how to position himself cleverly in the discourse: he appealed to the moral superiority and creativity of the United States during the Cold War. He pointed to a perceived supremacy of the United States and referred to its economic and technological capabilities. His message was: if congress supported multinational companies in their expansion across the globe, it would only endorse its own mission to strengthen American superiority in the Cold War. In his view, multinational companies were an essential part of the US technological leadership.

Dennison, as the executive of one of the leading fertilizer corporations, had advised governments on issues of world food supply for years: in India, at the request of Indian Prime Minister Jawaharlal Nehru, he had set up a fertilizer plant. Furthermore, as member of the Council of Foreign Relations, US president Lyndon B. Johnson’s Science Advisory Committee, as well as the Industry Cooperative Programme (ICP) of the Food and Agriculture Organization (FAO) of the United Nations (UN), he had advocated for private investments in so-called developing countries.¹²

What is interesting about him speaking at the symposium is that this made him part of a group of experts influencing rural development policies. The chair of the symposium, liberal Democrat Clemens J. Zablocki, aimed to gather “outstanding groups of specialists” including “departments and agencies of government, colleges, and universities, business and industry,

¹¹ Eldridge Haynes, “Statement before the National Advisory Committee on Food and Fiber,” 07.13.1966, Folder 9 Working Group on FAO Industry Relations, Box 44, Collection PR, FAO Archives, Rome.

¹² Wolfgang Saxon, “Charles S. Dennison, 78, Adviser To Governments on Many Issues,” *New York Times*, 05.28.1996, last accessed 12.28.2020: <https://www.nytimes.com/1996/05/28/us/charles-s-dennison-78-adviser-to-governments-on-many-issues.html>.

religious groups, foreign embassies, and other interested organizations.”¹³ The Green Revolution symposium made one circumstance very clear: Charles S. Dennison and his corporate colleagues sat at the same table and participated in discussions about rural development in the highest political circles, exchanging their point of view with philanthropic officials, university professors, intellectuals, or US politicians. They might not have been holding the pen when rural development policies were signed, but they were active participants in debates and indispensable partners in the supply of agricultural inputs for the execution of the Green Revolution in so-called developing countries in the 1960s and 1970s.¹⁴ Historical research has overlooked their role so far.

Historians of the Green Revolution are certainly more familiar with the other speakers of the symposium: advocates of population control programs and representatives of philanthropic foundations, US AID, and US American universities. All found their place in US-centric narratives of the Green Revolution. Historians have conducted in-depth case studies of their influence on US foreign policy-making through development aid in the Cold War. Narratives tend to focus on the seed research activities of philanthropic foundations and the latter's interactions with development policy actors such as governments and development agencies. Surprisingly, to date, multinational companies have received little attention in historical analyses of the Green Revolution. Historians Corinna R. Unger and Jonathan Harwood point out this gap in historical research, drawing attention to the impact on and activities of multinational corporations in strategies of rural development.¹⁵ The seeming invisibility of

¹³ Clemens J. Zablocki, in US Government Printing Office, “The Green Revolution. Symposium on Science and Foreign Policy,” 1.

¹⁴ The proceedings opened the doors for corporate leaders to formulate their visions of agricultural development in the US House of Representatives. Speakers included Charles S. Dennison, Vice president, International Minerals and Chemicals Corporation, W.L. Klarman, Business International Corporation, William R. Pearce, Vice President Cargill, Inc., or M. Ewarf Peters, Kerr-McGee Chemical Corporation.

¹⁵ Corinna R. Unger, “India's Green Revolution: Towards a New Historical Perspective,” *Südasiens-Chronik - South Asia Chronicle* 4 (2014): 254-70; Jonathan Harwood, “Was the Green Revolution intended to maximise food production?,” *International Journal of Agricultural Sustainability* 45, no. 6 (2019): 1-14.

CHAPTER I

multinational companies might be linked to the inaccessibility of many corporate archives. However, the neglect of multinational companies in historical analyses also reveals an unquestioning adoption of the technocratic attitudes of historical actors, who perceived multinational corporations as efficient providers of technology, acting outside of political power structures.¹⁶

In this dissertation, I take a closer look at the role of multinational companies in the design and execution of Green Revolution policies and ask the broad questions: in which ways did multinational corporations participate in the Green Revolution? Did they have an impact on setting the agenda of rural development in their home countries, in international organizations, and the Global South? If yes, to what extent?

The Green Revolution is usually told as a history of the dissemination of the so-called ‘miracle seed’. Highlighting its scientific advances and innovations, most Green Revolution histories begin with the activities of the international agricultural research institute *Centro Internacional de Mejoramiento de Maíz y Trigo (CYMMIT)*, funded and founded by the Mexican government and the philanthropic Rockefeller Foundation, leading to innovations in plant breeding in Mexico in the 1940s. Major innovations of this center were the use of a dwarf variety of wheat that, due to its thick and short straw, could carry a heavy and grain-packed head without breaking the plant’s stalk. Its successors produced wheat strains that were highly responsive to nitrogen fertilizer and proved productive when sufficiently irrigated. These research efforts continued with the support of the Ford Foundation for rice in the International Rice Research Institute (IRRI), Los Baños, Philippines, founded in 1960. Historians most often ascribe the success of the breeding activities to Norman Borlaug, the so-called ‘father of the Green Revolution’, who received a Nobel Prize for his plant breeding innovations in 1970. As the former head of the wheat-breeding program of the CYMMIT, the Nobel committee honored him for his role in the Green Revolution to end hunger through agricultural innovation.¹⁷ Norman Borlaug promoted

¹⁶ For example, John H. Perkins, *Geopolitics and the Green Revolution: Wheat, genes, and the Cold War* (New York, Oxford: Oxford University Press, 1997).

¹⁷ Perkins, *Geopolitics and the Green Revolution*; Cullather, *The Hungry World*.

his ‘universal’ approach to agricultural modernization on an almost global scale. He believed that the use of a technological package based on his high-yielding varieties in combination with an adoption of chemical fertilizers could free the world from hunger.

Historians usually answer the question of where the Green Revolution took place in terms of where the HYVs grew. Following this understanding, the early distribution of wheat varieties in Mexico was as much part of the Green Revolution as the Indian Intensive Agricultural Programme (IIAP) or the wheat intensification programs in Pakistan, the strategic use of high-yielding rice varieties in the Vietnam War, the dissemination of IR-8 rice varieties in the Philippines or later in Indonesia.¹⁸ By 1968, farmers of 18 countries sowed dwarf wheat.¹⁹ However, I argue that other parts of Green Revolution package (including inputs such as pesticides and chemical fertilizers) and their dissemination need to be included in historical analyses.

Agricultural data confirms rapid changes in grain production during the Green Revolution. On a global scale, the production of major food crops (wheat, rice, and maize) increased rapidly from the 1960s onward. By 1970, only 10 to 15 per cent of all wheat and rice lands in so-called developing countries were grown with the new ‘Green Revolution’ varieties. By 1983, these new varieties covered more than 50 per cent of wheat and rice lands, and by 1991, they covered about 75 per cent.²⁰ Yet, the high-yielding varieties only proved to be more productive than

¹⁸ See, for example, on Mexico, India, and Vietnam: Cullather, *The Hungry World*; on India: Akhil Gupta, *Postcolonial Developments: Agriculture in the Making of Modern India* (Durham, N.C.; London: Duke University Press, 1998); Perkins, *Geopolitics and the Green Revolution*; on Pakistan: Jack Loveridge, “The Hungry Harvest: Philanthropic Science and the Making of South Asia’s Green Revolution, 1919–1964” (PhD Diss., University of Texas, Austin, 2017); on Indonesia: Martin Schiller, “The Green Revolution in Java: Ecological, socio-economic and historical perspectives,” *Prisma*, no. 18 (1980): 71–93; on the Philippines: Victoria M. Arcega, “Technocrats as Middlemen and Their Networks in the Philippine Rice Project: The Case of the Masagana 99” (PhD Diss., Michigan State University, 1976); on Columbia: Timothy W. Lorek, “Imagining the Midwest in Latin America: US Advisors and the Envisioning of an Agricultural Middle Class in Colombia’s Cauca Valley, 1943–1946,” *Historian* 75, no. 2 (2013): 283–305.

¹⁹ Perkins, *Geopolitics and the Green Revolution*, 245–6.

²⁰ John Robert McNeill, *Something New Under the Sun: An Environmental History of the Twentieth-Century* (New York: W. W. Norton, 2000): 249.

CHAPTER I

traditional ones if complemented by fertilizer and other chemical inputs, such as herbicides and pesticides. Consequently, over the course of the Green Revolution, the global market for agricultural supplies grew rapidly: In 1958, global consumption of chemical fertilizer totaled to 25 million metric tons. By 1988, consumption rates multiplied almost seven-fold, to 145 million metric tons. Almost half of this consumption—76.3 metric tons of chemical fertilizer—can be attributed to so-called developing countries. The changes in the market for herbicides and pesticides showed a similar pattern.²¹ Hence, through the dissemination of high-yielding varieties, the Green Revolution favored the establishment and reinforcement of a class of actors that manufactured, traded, and promoted these inputs: agribusiness companies.

The Green Revolution was soon subject to major criticism as social, sometimes violent, conflicts emerged in those areas that applied the new technologies, for example in Punjab, India. Critics such as Vandana Shiva saw the violence as a result of the neglect of social and ecological dimensions of rural development, favoring a unilateral focus on increasing agricultural productivity. Farmers owning large farms and capital had better access to the scale-dependent opportunities of the Green Revolution and, therefore, an advantage in the technological adoption process. This resulted in increasingly unequal patterns of land ownership, linked to high property and rent prices throwing people off the land. (Some modernizers were in favor of the resultant large-scale rural-urban migration, which provided cheap a labor force for the factories.) Furthermore, the massive application of chemical inputs and the increasing use of ground water for irrigation came with the risk to decrease agricultural productivity in the long run.²²

²¹ Murray J. Leaf, "Agribusiness," in Shepard Krech, John Robert McNeill, and Carolyn Merchant (eds.), *Encyclopedia of world environmental history* (New York, London: Routledge, 2004): 23–7.

²² For example: M. S. Randhawa, "Green Revolution in Punjab," *Agricultural History* 51, no. 4 (1977): 656–61; Wolf Ladejinsky, "Ironies of India's Green Revolution," *Foreign Affairs* 4, no. 48, (1970): 758; Vandana Shiva, *The Violence of the Green Revolution: Ecological Degradation and Political Conflict in Punjab* (Dehra Dun: Research Foundation for Science and Ecology, 1989); Kusum Nair, *In Defense of the Irrational Peasant: Indian Agriculture After the Green Revolution* (Chicago, London: University of Chicago Press, 1979); Atul Kohli, *The State and Poverty in India: The Politics of Reform* (Cambridge: Cambridge University Press, 1987).

A BRIEF LITERATURE REVIEW

DIFFICULTIES TALKING ABOUT ‘THE’ GREEN REVOLUTION

Many Green Revolution narratives seem to suggest that there was a singular Green Revolution experience in a generalized so-called ‘developing world’, based on a package of modern technologies, notably high-yielding varieties (HYVs) and capital-intensive inputs. Historian Nick Cullather calls these understandings of the ‘Green Revolution’ a myth. For him, Green Revolution experiences were more ambiguous. He tried to overcome the narrative of a homogeneous and unidirectional agricultural transformation process with a past of successful development interventions to transfer US scientific agriculture to Latin America, Asia, and Africa, leading to higher agricultural productivity. In his view, these interpretations are highly problematic given the multitude of Green Revolution experiences across the globe.²³

Citing the shortcomings of using the term ‘Green Revolution’, historian Tore Olsson considers that future historians might even abandon the “narrative container”²⁴ of the Green Revolution altogether, when writing about agrarian and agricultural change. Instead of understanding the Green Revolution as a delimited, singular development strategy, it would be more appropriate to talk about ‘green revolutions’ considering the complexities of different political, environmental, and social contexts, in which the high-yielding varieties and industrial production methods were spread. Nonetheless, there are certain advantages in studying the ‘capitalized’ Green Revolution, as Tore Olsson observed: “it imparts a cohesive narrative with a set of chronological and geographical parameters, familiar protagonists, and an ability to speak to today’s policy-makers and practitioners.”²⁵ I follow this argument for my dissertation.

²³ Nick Cullather, *The Hungry World* (Cambridge, London: Harvard University Press, 2010).

²⁴ Tore C. Olsson, *Agrarian Crossings: Reformers and the Remaking of the US and Mexican Countryside* (Princeton: Princeton University Press, 2017): chapter 5.

²⁵ Tore Olsson, in: Prakash Kumar, Timothy Lorek, Tore C. Olsson, Nicole Sackley, Sigrid Schmalzer, and Gabriela Soto Laveaga, “Roundtable: New Narratives of the Green Revolution,” *Agricultural History* 91, no. 3 (2017): 416.

CHAPTER I

Talking about the Green Revolution creates a narrative space to discuss the impact of multinational corporations on rural development beyond regions and in a longer time span.

The term ‘Green Revolution’ in and of itself creates some misleading images of the rural transformation processes in the 1960s and 1970s. The term ‘revolution’ evokes connotations of political upheaval, discontinuity, social change, and violence. The Green Revolution, however, describes the rapid expansion of technological change and innovation that was rather continuous in terms of on-farm technological change. Thus, the Green Revolution should be understood as a period in which a particularly strong ‘technocratic’ approach to thinking about social and political conditions in rural areas prevailed. This approach relied heavily on state interventions to promote industrially manufactured farm inputs. Green Revolution policies were based on the idea that social problems were to be resolved through technological innovation favoring the involvement of a specific set of actors (such as multinational companies) because their expertise and knowledge was considered indispensable for rural development.

When I use the term ‘Green Revolution’ in this research, I refer to the commonalities in terms of the promotion of a ‘package’ of inputs based on high-yielding varieties in combination with fertilizers and other chemical inputs that required the involvement of agrichemical corporations. The ‘Green Revolution’ may have varied in different regional or local contexts. However, for my historical analysis, it is necessary to refer to the ‘Green Revolution’ as a cohesive set of chronological and geographical parameters, which allow for broadening the spatial scale for analyzing the far-spread activities of multinational corporations as global actors. However, working with the concept of the Green Revolution requires defining the scope of actors and geographical expansion that I use as a frame of reference. Hence, the following section offers answers to the questions: What do I understand the Green Revolution to be? How do I define its key actors, time period and geographical boundaries?

THE ‘GREEN REVOLUTION’ AS A ‘CHILD OF THE COLD WAR’

Following Nick Cullather’s lead, this dissertation understands “development as history” and contributes to the growing field of the history of development by understanding multinational

corporations as important protagonists in development processes and structures.²⁶ The foundational notion in the historiography of development is that there is no common sense definition of what ‘development’ meant across different periods (i.e. meanings varied within the colonial and postcolonial contexts, different geographies and according to different development actors). Yet historian Corinna R. Unger acknowledges some continuities in different notions of development, such as a “concern of those living under privileged conditions to change economic, social, and sometimes political conditions elsewhere” which constitutes an “element of difference” in development.²⁷

Despite the variety of diverging concepts, most understandings of development have in common their association with growth, principally economic growth—based on the idea that economic assistance serves as a means to enable a transformation process from “low-income national economies” into “modern industrial economies.”²⁸ Others think about development as a tool to strengthen democracy, protect individual freedoms, or produce social equality. Critics of development, however, criticize it as a “Western ideological construct that helps to maintain the inequality between the so-called First World and the so-called Third World.”²⁹ They interpret development as a way for companies and governments to reach markets and resources, thereby contributing to the privatization of public goods.³⁰

The history of the Green Revolution is part of the history of development aid in the United States. In the US, ‘development’ as a foreign policy goal gained importance after the Second World War. The Second World War did not only change the position of power of the United States in the world, it also changed its citizens’ perceptions of the world’s poverty. Soldiers came home and reported on the poor living conditions they experienced in the Global South, thereby raising public awareness of global inequalities. In the fast-paced ideological battle of

²⁶ Nick Cullather, “Development? It’s History.” *Diplomatic History* 24, no. 4 (2000): 641–53.

²⁷ Unger, *International Development*, 16.

²⁸ As defined by the *Encyclopedia Britannica* in: Unger, *International Development*, 16.

²⁹ *Ibid.*

³⁰ Unger, *International Development*, 9.

CHAPTER I

“the hearts and minds” between the United States as representatives of a liberal and the Soviet Union of a communist world order, improving the living conditions through development aid soon became an important mission for the United States. In general, US development ideas after the Second World War built on technocratic approaches to fight poverty.

This premise translated into the technical assistance ‘Point Four’ program famously introduced by US President Harry S. Truman, in his inauguration address in 1949. In this address, Truman made the fight against poverty in so-called developing countries his fourth foreign policy objective with the aim to win the “hearts and minds”³¹ of the so-called developing world by showing that capitalism and democracy could secure the welfare of the individual. His approach reflected the common understanding of the postwar period that a lack of access to technologies as well as capital caused underdevelopment. Hence, development did not only demand technology transfers but also foreign capital investments. In Truman’s vision, “private capital”³² and business played a crucial role in extending the industrial activity and triggering economic development. Yet, he stressed, all economic cooperation should include “concepts of democratic fair-dealing” to overcome colonial power relations, which he described as “imperialism-exploitation.”³³ The Point Four Program initiated a period of extensive use of development aid to expand spheres of influence in the Cold War, peaking with Kennedy’s Development Decade in the 1960s.

Leading social theorists in the 1960s, such as Walt W. Rostow, inextricably linked ideas of development to their ‘modernization theory’. In this theory, multinational corporations played an essential role as engines of change. The question of how these ideas of ‘modernization’ have shaped the goals and motivations of US foreign policy-makers after the Second World War has received major scholarly attention in poststructuralist analyses of development, as well as in

³¹ Harry S. Truman, “Truman’s Inaugural Address: Delivered in Person at the Capitol (1949),” last accessed May 20, 2018, https://www.trumanlibrary.org/whistlestop/50yr_archive/inagural20jan1949.html.

³² Ibid.

³³ Ibid.

histories of US foreign policy-making.³⁴ For example, post-structuralist Arturo Escobar argues that ‘modernization’ as a broader worldview resonated well with long-held assumptions and beliefs about America’s historical mission in the world and inaugurated a “period of certainty” based on the “beneficial effects of capital, science, and technology.”³⁵ Therefore, modernization theory worked as an alternative framework to revolutionary communism and the legacy of European colonialism.³⁶ Much of these intellectual histories illuminate ‘modernization’ as the dominant scientific and social paradigm of the elite debates and institutional networks that formed national and international policies and programs in the 1950s and 1960s.

Social scientists Walt W. Rostow, through his function as advisor to US Presidents John F. Kennedy and Lyndon B. Johnson during the Vietnam War, and Max F. Millikan, due to his strong personal ties to the Central Intelligence Agency (CIA), were particularly influential in the formulation of development policies abroad.³⁷ The Kennedy administration, especially, gave public intellectuals privileged access to policy-making bodies as academic advisors.³⁸ Particularly, the Rostovian take-off model—a linear model of progress in stages that Walt W. Rostow designed as counter-example to the Marxist revolutionary model—enjoyed great popularity and a high level of influence on policy-making.³⁹ Their modernization theory gave

³⁴ For poststructuralist analyses of “development,” see, for example: Arturo Escobar, *Encountering Development: The Making and Unmaking of the Third World* (Princeton, N.J.: Princeton University Press, 1995); James Ferguson, *The Anti-Politics Machine* (Minneapolis: University of Minnesota Press, 1985). For histories of US foreign policy-making, see, for example: Nils Gilman, *Mandarins of the Future: Modernization Theory in Cold War America* (Baltimore, London: Johns Hopkins University Press, 2003); Michael E. Latham, *Modernization as Ideology: American Social Science and “Nation Building” in the Kennedy Era* (Chapel Hill, N.C., London: University of North Carolina Press, 2000).

³⁵ Escobar, *Encountering Development*, 447.

³⁶ Joseph Morgan Hodge, “Writing the History of Development (Part 1: The First Wave),” *Humanity* 6, no. 3 (2015): 440–41.

³⁷ Eric B. Ross, *The Malthus Factor: Population, Poverty and Politics in Capitalist Development* (London: Zed Books, 1998): 146.

³⁸ Unger, *International Development*, 19.

³⁹ This economic model described the development of a nation as a linear model of ‘progress’ and contained five different ‘stages’ of economic growth for a country’s development: (1) traditional society, (2) preconditions for take-off, (3) take-off, (4) drive to maturity, and (5) high mass consumption. This model took the experiences of the ‘industrialized nations’, especially Great Britain, as a role model and

preference to technical solutions so that the technical knowledge and experience of private corporations became particularly important. Leading policy-makers understood corporations as efficient, experienced, and knowledgeable partners in the transfer of technologies. As a result, policy-makers sought proximity to corporate leaders who gained a similar access to policy-making bodies as public intellectuals. With corporate leaders as advisors to the government, business-friendly approaches to development became more likely.

The major works of historian John Perkins' *Geopolitics and the Green Revolution* and the excellent and wide-in-scope analysis of historian Nick Cullather's *The Hungry World* introduced the understanding of the Green Revolution as a geopolitical strategy in this Cold War context.⁴⁰ Both Cullather and Perkins stress the impact of US security concerns as well as the importance of food and development as a 'front' during the Cold War, interpreting them as a means to expand geopolitical spheres of influence. From the Cold War perspective, the Green Revolution was born of the fear of seeing the Chinese Revolution of 1949 repeat itself in other so-called developing countries. The idea was that if peasants around the world escaped poverty through technological innovations in agriculture, they might be less likely to seek political solutions. Hence, the technological package of the Green Revolution offered a means of preventing the spread of communist ideologies and received most support in those countries where US policy-makers perceived communist revolutions the most likely in the 1960s. In that context, the Green Revolution was a "child of the Cold War."⁴¹

A growing body of literature criticizes this common understanding of the Green Revolution as an externally inspired 'modernist' intervention into the problem of rural poverty through international development aid. Critics argue that by focusing on Western elites, these

thereby promoted ideas of development as industrialization. Max F. Millikan and Walt W. Rostow, "Notes on Foreign Economic Policy" in *Universities and Empire* ed. Christopher Simpson (New York: New Press, 1998 [1954]): 39–55; Walt W. Rostow, *The Stages of Economic Growth: A Non-Communist Manifesto* (Cambridge: Cambridge University Press, 1990); Kimber Charles Pearce, *Rostow, Kennedy, and the Rhetoric of Foreign Aid* (East Lansing: Michigan State University Press, 2001).

⁴⁰ Perkins, *Geopolitics and the Green Revolution*; Cullather, *The Hungry World*.

⁴¹ Sigrid Schmalzer, *Red Revolution, Green Revolution: Scientific Farming in Socialist China* (Chicago: University of Chicago Press, 2016): 3.

interpretations contribute to an understanding of development as a Western, primarily US American intervention.⁴² Concentrating on the intentions of diplomats and public officials, as well as political and social theorists, narratives of the Green Revolution as a child of the Cold War neglect actors affected by the agricultural transformation on the ground, such as farmers or local administrators. Many historical interpretations of the Green Revolution are therefore likely to create a picture showing a few individuals in the US initiating the Green Revolution, which then spread freely, without any further involvement. Consequently, the US-American-centered analysis tends to mirror a “one-sided, top-down perspective of development.”⁴³

Histories of the Green Revolution are more convincing when seen through a postcolonial lens, which shows that ‘development’ was reciprocal and the result of “interaction between the American brand of modernization and local visions of progress in South Asia.”⁴⁴ Postcolonial historians demand that the Green Revolution is written as a social history from the ‘local,’ and analyzed from the perspective of peasants and rural populations. Modernization was then a ‘global’ project, similarly contested between the two blocs of the Cold War, and within them.⁴⁵

In this dissertation, I challenge the US centric analysis by understanding European corporations as actors of the Green Revolution. I present the Green Revolution as the result of a complex network of interactions that involves, but is not limited to, US American actors. I follow as well US American as European multinational companies from their headquarters in the Global North, to exchanges with their home governments, to meetings in International Organizations, and to their exchanges with governments and farmers in the Global South. I thereby trace the strong ties of multinational corporations to the Western, but also to the postcolonial development project. However, by focusing on multinational corporations as the protagonists of my analysis,

⁴² Hodge, “Writing the History of Development (Part 1: The First Wave),” 449–52.

⁴³ Unger, “India’s Green Revolution”; David Engerman and Corinna R. Unger, “Introduction: Towards a Global History of Modernization,” *Diplomatic History* 33 (2009): 257.

⁴⁴ Kumar et al., “Roundtable: New Narratives of the Green Revolution,” 406–7; Akhil Gupta, *Postcolonial Developments: Agriculture in the Making of Modern India* (Durham, N.C., London: Duke University Press, 1998).

⁴⁵ Engerman and Unger, “Introduction: Towards a Global History of Modernization,” 377.

CHAPTER I

I contribute to an understanding of development actors as a Western elite project. Being aware of the related problems of this approach, I emphasize interactions of companies with governments in so-called developing countries and their experiences in rural areas in order to include a ‘local’ perspective— even though the scope of their experiences in the rural space was very limited. Industrial development projects—large-scale dams and factories—were the focus of the development community in that time. Rural development often played only a subordinate role. The research on the history of development mirrors the same bias by focusing on industrial projects. However, in 1960, about 80 per cent of the population of the Global South lived in rural areas.

I use the term ‘Green Revolution’ to describe a market-based approach to rural development that uses commercialization to generate increases in the production of wheat, maize, and rice. This dissertation focuses predominantly on the Green Revolution in India and Indonesia. I stress the understanding of the Green Revolution as a ‘package’ approach that attempted to achieve agricultural ‘modernization’ using high-yielding varieties of rice, maize, and wheat combined with capital-intensive chemical inputs such as fertilizers, insecticides, and herbicides. The use of capital-intensive technologies demanded the extension of credit, visualized in figure 1. The Green Revolution approach relied on the ‘technocratic’ premise that the means of science and technologies were suitable to improve the living conditions of the inhabitants of rural areas; thus, areas long perceived as backward and resistant to progress played part in a project of ‘modernization’.

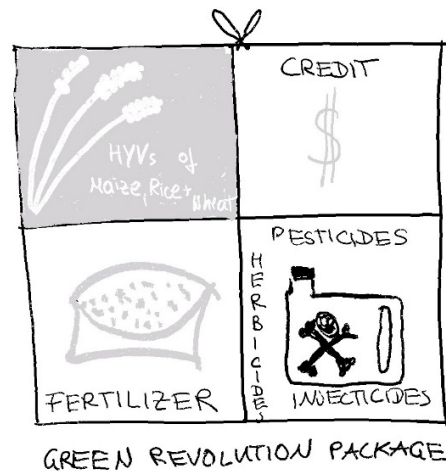


Figure 1 The technologies of the ‘Green Revolution’ as a package of interdependent inputs

THE GREEN REVOLUTION APPROACH IN THE HISTORY OF RURAL DEVELOPMENT

The twentieth century saw a major change in agriculture from *subsistence farming*—with the main goal being production of family food—to *commercial farming*—with the major goal being to sell the produce on markets.⁴⁶ Historians find the roots of the process of *depeasantation* in changing agricultural practices.⁴⁷ Depeasantation describes the global phenomenon of rural-urban migration in the twentieth century. In the United States of the 1920s and 1930s, mechanization of agriculture was the main trigger of rapid increases in productivity on the vast lands available to US American farmers. In densely populated Western Europe, however, it was the *intensification* of agriculture based on the use of chemical inputs such as fertilizers, which triggered productivity increases in this period. Rapid growth in agricultural productivity in the Global South in the second half of the twentieth century postdates the agricultural transformations of Western Europe and the United States. It is important to note the regional

⁴⁶ Elisha Walter Coward, “The subsistence to commercial transition in agricultural development,” (PhD Diss., Iowa State University, 1969); Clifton R. Wharton, *Subsistence Agriculture & Economic Development* (New York: Routledge, 1969).

⁴⁷ Araghi, Farshad A., “Global Depeasantization, 1945–1990,” *The Sociological Quarterly* 36, no. 2 (1995): 337–68.

CHAPTER I

distinctions in terms of the types and modes of technological application to increase productivity, but also to observe commonalities in terms of changing market relations. The agricultural transformation processes coincided with the transformation of local and global market structures, known as globalization(s).⁴⁸ As part of the globalizing trend of the twentieth century, trade networks and markets for agricultural commodities and supplies expanded spatially and intensified. Furthermore, multinational companies emerged as a new and influential group of actors in global food production.

The similarities in changes across the globe gave rise to the assumption that the Green Revolution was not limited to the Global South. Historians such as Jonathan Harwood or Tore Olsson use the term ‘Green Revolution’ to describe changes in agricultural practices in Europe and the United States in the beginning of the twentieth century.⁴⁹ While this understanding is useful to overcome the artificial dichotomy of the North-South divide in analyzing commonalities in rural transformations, it ignores the differences in the networks of actors involved in the design and execution of rural development strategies. While rural development was primarily a domestic project in the United States and Europe, rural development in the context of the Green Revolution of the 1960s and 1970s was heavily influenced by third-party and foreign interests under the label of ‘international development’. Including the agricultural transformations in Europe and the United States within the Green Revolution narrative would mean including the period before 1945, which would detach the phenomenon of the Green Revolution of its postcolonial context and the Cold War world order and ideas. Therefore, I argue in favor of understanding the Green Revolution as an approach to rural development that was particular to the ‘development decade’ of the 1960s and the 1970s—a period marked by a

⁴⁸ James N. Rosenau, “Many globalizations, one international relations,” *Globalizations* 1, no. 1 (2004): 7–14; Jerry H. Bentley, “Globalizing history and historicizing globalization,” *Globalizations* 1, no. 1 (2004): 69–81.

⁴⁹ Jonathan Harwood, *Europe’s Green Revolution and Others Since: The rise and fall of peasant-friendly plant breeding* (London, New York: Routledge, 2012); Olsson, *Agrarian Crossings*; Jonathan Harwood, “The green revolution as a process of global circulation: plants, people and practices,” *Historia Agraria. Revista de agricultura e historia rural* 75 (2018): 7–31.

bipolar international order and enormous power and wealth imbalances between the former colonizers and colonized.

Following the Second World War, perceptions of the rural economy in international development carried a strong colonial notion. Governments of the newly founded nations continued numerous agricultural and rural projects that colonial administrators initiated which lead to personal continuities in national ministries and administrations.⁵⁰ Understandings of a dual economy—comprised of a rural space that development policy-makers perceived as backward and the presumably progress-promising industry—shifted the attention of planners to industrialization and the urban centers. In the process of decolonization, the fastest possible industrialization seemed to be a way for so-called developing countries to get rid of their alleged backwardness in order to meet the formerly colonial powers as equals soon. Large-scale projects such as the construction of hydroelectric dams or steel mills promised high returns and had a strong symbolic power showing that postcolonial nations were culturally, socially, and politically comparable to others.⁵¹ Consequently, especially in the 1950s, the majority of development projects was concerned with industrialization. Meanwhile, in the process of decolonization, political circumstances changed fundamentally, in terms of how citizens related to their newly independent nations and of how political leadership legitimized its power; it changed the socioeconomic ideas that governments believed in. In this context, for the new regimes, development often served as a tool for nation building.⁵²

In the processes of decolonization there were competing approaches of how to develop rural areas: in earlier approaches, rural development tended to focus on the redistribution of land to

⁵⁰ A large body of history of development literature documents these personal continuities: Frederick Cooper and Randall M. Packard (eds.), *International Development and the Social Sciences: Essays on the History and Politics of Knowledge* (Berkeley, London: University of California Press, 1997); Joseph Morgan Hodge, *Triumph of the Expert: Agrarian doctrines of Development and the Legacies of British Colonialism* (Athens: Ohio University Press, 2007); Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley, London: University of California Press, 2002); Véronique Dimier, *The Invention of a European Development Aid Bureaucracy: Recycling Empire* (Basingstoke: Palgrave Macmillan, 2014).

⁵¹ Unger, *International Development*, 83.

⁵² Unger, *International Development*, 81–3.

CHAPTER I

overcome rural inequalities. For example, in Mexico of the 1920s, or in Japan under US occupation of the 1940s, policy-makers understood access to land to be a key determinant to improve rural economic conditions; land reforms should serve to gain more egalitarian land ownership patterns. Changing land ownership patterns was often problematic; the existing power structures, (i.e. the privileges and property of the landowning upper classes), were under attack.⁵³

In postcolonial India, the new government led by Prime Minister Jawaharlal Nehru from 1947 initially called for land reform but failed because of the resistances of landowning elites, unwilling to share wealth and privileges across caste differences. Nehru had to give up his plan under pressure to obtain electoral support. Instead, he promoted the countrywide *Community Development Programme*. In its promotion of the village, the Community Development Programme could connect rhetorically to the Gandhian legacy and drew on international as well as Indian experiences from the 1920s. Many development projects that carried the label ‘Community Development’ outside of India were very different in goals and character: from colonial projects such as community development organized by the British in Tanganyika to the Comilla project in Pakistan initiated in 1959 by Akhter Hameed Khan, a Pakistani social scientist.⁵⁴ These projects had in common the goal of improving the immediate living conditions of the very poor, more in rural than in urban areas. Community development promised to reduce poverty and inequality through primary education, sanitation, health measures, support for small-scale industries, small infrastructure projects, and agricultural improvements—by the means of self-help, giving rural people the skills and knowledge needed to improve their own situation. Community Development was to be implemented through small-scale and decentralized grassroots projects supported by extension officers. Similar to the Green

⁵³ Wolf Ladejinsky, “Agrarian Reform in Asia,” *Foreign Affairs* (April 1964): 758; Ladejinsky, “Ironies of India’s Green Revolution.”

⁵⁴ Unger, *International Development*, 105–6.

Revolution, Community Development relied on agricultural sciences and technologies to modernize agriculture. The promoted technologies were however less capital-intensive.⁵⁵

Support for the Community Development approach waned when the number of famines and food shortages grew in the late 1950s, and the international concern with population growth intensified. With the growing so-called ‘Malthusian’ fears that the population could no longer be fed, critics argued that Community Development could not effectively address the perceived ‘food problem’. A broad ‘technocratic’ conviction grew—among postcolonial leaders and the Western development community alike—that the only solution was the systematic use of newly available kinds of technology resulting in the agricultural intensification measures of the Green Revolution in the 1960s. Most of the ‘Green Revolution’ interventions were state-led and centralized in planning. Since the seeds were promoted as packages with chemical inputs (in campaigns such as the Indian Agricultural District Programme (IADP)), governments supported the market access of the agricultural supply industry through their promotion of the ‘Green Revolution’ seeds. This trend continued into the early 1970s with state-led credits and subsidy programs.

Ideas of rural modernization changed with the Green Revolution. Theodore Schultz’s book *Transforming Traditional Agriculture* (1964) inspired policy changes in rural development that involved new thinking about agriculture and the peasant. While earlier theorists of economic and agricultural development argued that farmers were too stubborn and backward to become part of a ‘modern’ economy, Schultz was convinced that farmers acted rationally to achieve progress and needed access to capital and modern technology only to thrive economically.⁵⁶ Thus, he argued, farmers should be seen like other economic actors that react to price and other market incentives. Hence, using the means of scientific research, promoting access to capital,

⁵⁵ Corinna R. Unger, “India’s Green Revolution,” 254–70; Daniel Immerwahr, *Thinking Small: The United States and the Lure of Community Development* (Cambridge, Massachusetts: Harvard University Press, 2015): 66–101; Cullather, *The Hungry World*, 72–108; Unger, *International Development*, 109.

⁵⁶ Theodore W. Schultz, *Transforming Traditional Agriculture* (New York: Arno Press, 1964); Corinna R. Unger, *Entwicklungspfade in Indien: Eine internationale Geschichte, 1947-1980* (Göttingen: Wallstein Verlag, 2015).

CHAPTER I

and disseminating a technology package, promoters of the Green Revolution such as the Rockefeller Foundation and Ford Foundation, US AID, or the Mexican and Indian government attempted to ‘modernize’ agriculture and rural lives.

Compared to land reform, the Green Revolution approach had a major advantage: it promised to improve the situation of the rural population without intervening in existing relations of power and privilege. Especially US rural development policy-makers believed that through the promotion of technologies, the Green Revolution could serve as a means to reduce the susceptibility of rural populations to radical redistribution. Relying heavily upon technical solutions to solve the social problem of poverty, the Green Revolution promised to improve the situation of rural populations without the need to fight the resistances of local elites, who owned the land. The dissemination of technologies appeared to be ‘neutral’, in the sense of being apolitical, although, to a certain extent, the interventions privileged those farmers who were already better off, and shifted part of their profits to another set of actors such as corporations or credit institutes.

Yet, linked to the growing socioeconomic criticism of the Green Revolution in the late 1960s and early 1970s, the basic idea of community development—that farmers need to be empowered to participate in these developments—found more support again. Consequently, approaches such as the *Integrated Rural Development* approach promoted by the World Bank and other development institutions in the 1970s and 1980s focused again on increasing the income of smallholder farmers. Meanwhile, with the debt crises of the early 1970s, calls for market liberalization also grew louder, calling for the state to be relieved off its developmental responsibilities. Liberal approaches to rural development became hegemonic in the 1980s and created much space for multinational corporations to consolidate their influential position in rural development. Profiting from the ‘retreat of the state’ in the economic liberalization movement of the 1980s, multinational corporations replaced state institutions as leaders in agricultural research.

**RESEARCH APPROACH: SEEING THE ‘GREEN REVOLUTION’ THROUGH A
CORPORATE LENS**

LOOKING BEYOND THE SEED

By understanding the Green Revolution as a ‘package’ approach, inputs other than seeds necessarily shift in the focus of analysis. In the marketing of these inputs, policy-makers such as the US government, the FAO, and to a limited extent, governments in some so-called developing countries, saw multinational corporations as efficient providers and manufacturers of these inputs. Markets and sale structures were to assure efficient distribution networks and motivate private actors to invest in so-called developing countries.

Historian Nicole Sackley points out that the focus on inputs other than seeds leads our focus away from the agricultural scientists and philanthropic foundations who “championed” the development of high-yielding varieties and “expand the subjects and institutions we study when we study the Green Revolution.”⁵⁷ Our focus shifts from seeds to fertilizers, from fields to factories, and from farmers to engineers. When all these actors turn into participants in rural development schemes, the interdependence of the industrial and the rural sector becomes visible. In general, most histories of the Green Revolution focus on US foreign policy-makers and, in particular, the impact of large philanthropic foundations such as the Rockefeller Foundation and the Ford Foundation in the dissemination of Green Revolution technologies.⁵⁸ Focusing on philanthropic actors neglects a large network of actors involved in the Green Revolution. This network included governments in the Global South and Global North and their

⁵⁷ Sackley in Kumar et al, “Roundtable: New Narratives on the Green Revolution,” 405.

⁵⁸ See, for example: Deborah Fitzgerald, “Exporting American Agriculture: The Rockefeller Foundation in Mexico, 1943-53,” *Social Studies of Science* 16, no. 3 (1986): 457–83; Perkins, *Geopolitics and the Green Revolution*; Kristin Ahlberg, *Transplanting the great society: Lyndon Johnson and Food for Peace* (Columbia: University of Missouri Press, 2008); Cullather, *The Hungry World*; Harwood, *Europe’s green revolution and others since*; Nicole Sackley, “Foundation in the Field: The Ford Foundation New Delhi Office and the Construction of Development Knowledge, 1951–1970,” in *American Foundations and the Coproduction of World Order in the Twentieth Century*, eds. John Krige and Helke Rausch (Göttingen: Vandenhoeck & Ruprecht, 2012): 232–60; Olsson, *Agrarian crossings*.

respective development agencies, as well as international organizations such as the Food and Agriculture Organization (FAO), and multinational corporations.⁵⁹

By ignoring the complexity of this network of actors, the impact of philanthropic foundations on the agricultural modernization of the 1960s and 1970s appears exaggerated. Certainly, the Rockefeller Foundation and Ford Foundation were key actors by funding agricultural research activities in the fields of plant breeding, which led to the successful development of the so-called ‘miracle seeds’ of the Green Revolution. Yet these seeds were more effective only if applied with a sufficient amount of fertilizer and irrigation water. Shifting the focus to different parts of the Green Revolution package allows a new and more holistic understanding of international constellations that enabled a yield take-off in the 1960s and 1970s. Once we consider other parts of the Green Revolution package beyond seeds, other, so far obscured, actors become visible—multinational corporations.

Recent scholarship, primarily by historian Sigrid Schmalzer, attempts to include agricultural modernization efforts in China under the label of the Green Revolution, because the Chinese model of agricultural intensification also used variations of the Green Revolution high-yielding varieties. Her approach to include China makes sense if the grown varieties, the seed, define where the Green Revolution took place. In that case, the Chinese model illustrates increases in yield were possible with the use of manure instead of chemical inputs, with which China was under-supplied. Moreover, it shows that decentralized research of agricultural methods offered an alternative research approach to the more centralized agricultural research systems in other

⁵⁹ Although the scholarship exploring the role of international organizations in global development policies is growing, historical scholarship that examines the impact of international organizations on rural development beyond the FAO is still comparatively small. There is little knowledge regarding the pathways of how the World Bank invested in rural development and in the Green Revolution, in particular. As part of the larger research project on the international history of rural development after 1945, my colleague Verena Kröss is currently working on a history of rural development doctrines in the World Bank. The official history of the World Bank described the Bank’s funding activities in irrigation infrastructure as a “pivotal component” of the Green Revolution. Yet, this history does not account for further details. Devesh Kapur, Richard Charles Webb, and John P. Lewis, *The World Bank: Its First Half Century* (Washington, D.C.: Brookings Institution, 1997): 205.

countries.⁶⁰ Thus, comparing the Chinese model to the Green Revolution model allows for interesting insights about alternative agricultural strategies, inputs, and distribution networks for agricultural supplies. Yet summarizing all attempts to agricultural intensification under the label ‘Green Revolution’ weakens the analytical framework and neglects important political and organizational differences between different strategies of agricultural modernization. Understanding the Chinese model as part of the Green Revolution however does not do justice to the differences in approaches to agricultural modernization between the ‘capitalist’ and the ‘socialist’ model.

I understand the Green Revolution as the result of a specific ideological and intellectual framework that promoted the commercialization of agricultural production and gave a key role to private corporations in the transfer, development, and dissemination of technologies. The Green Revolution as a ‘capitalist’ approach to rural development was based on and directed towards the establishment of a capital market, an input market, and a market for the harvest. Unlike the Chinese model, multinational corporations played an important role in this approach. In the following chapters, I will show that they were indispensable participants in the Green Revolution due to their expertise in technology transfer and production of inputs.

ACKNOWLEDGING THE AGENCY OF MULTINATIONAL CORPORATIONS IN DEVELOPMENT

Marco Polo, Christopher Columbus, or the East India Company could tell a long story of the expansion of business relations across the globe that reaches back far beyond the globalization processes of twentieth century. By the early 1960s, however, a group of key actors within a global economy had emerged that came to be known as *multinational corporations*—companies that maintained business relations beyond borders and set up subsidiaries or participated actively in the management of foreign companies abroad. David Lilienthal, prominent as a development expert and director of the Tennessee Valley Authority, first described these businesses with the term ‘multinational corporation’ in 1960. Unlike their predecessors—e.g. colonial trade companies—scholars, policy-makers, and commentators started to criticize multinational

⁶⁰ Schmalzer, *Red Revolution, Green Revolution*.

corporations as a global force that challenged the boundaries of nation-states by avoiding the jurisdiction of national and international state direction.⁶¹ This research contributes to a better understanding of the emergence of this group of actors in the twentieth century, and more specifically, agribusiness corporations.

An earlier approach of historian Shane Hamilton that examined the ‘rise of agribusiness’ during the Cold War negated the interdependence of the rise of a “transnational class of agribusinesses” and the development campaigns of the Green Revolution.⁶² While his analysis of agribusiness focused on retail businesses and agricultural commodity traders, my research brings the agricultural supply industry into the focus, examining its role in commercialization and marketization processes from the field to the supermarket. Figure 2 illustrates this chain.

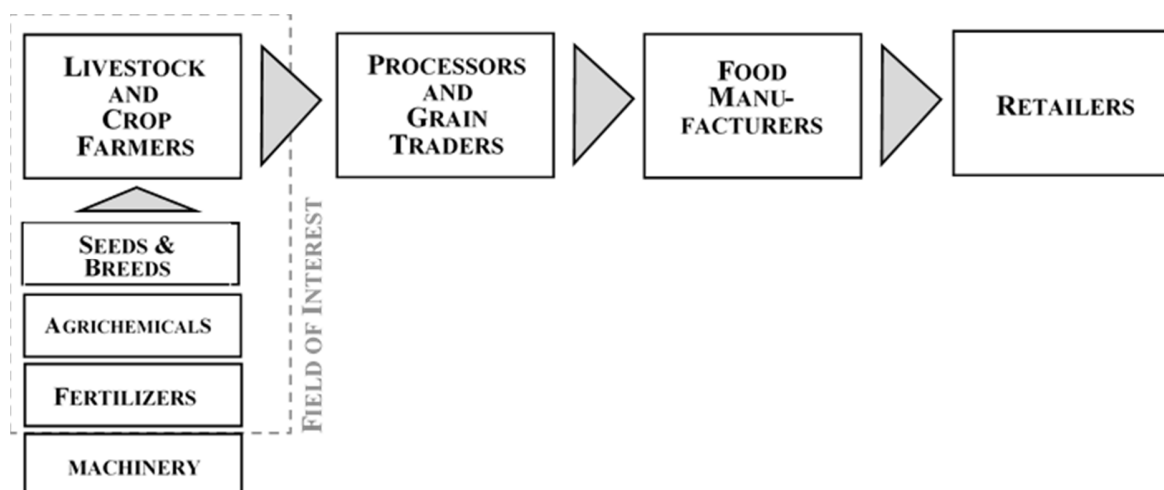


Figure 2 Global Agrifood Supply Chain (Inspired by Hendrickson et al., 2017; p. 13)

To date, predominantly Marxist-oriented analyses put forth the connection of development campaigns and the emergence of multinational corporate hegemony. In studies of the Green

⁶¹ Tehila Sasson, “Milking the Third World? Humanitarianism, Capitalism, and the Moral Economy of the Nestlé Boycott,” *The American Historical Review* 121, no. 4 (2016): 1196–1224.

⁶² Shane Hamilton, *Supermarket USA: Food and Power in the Cold War Farms Race* (New Haven, CT: Yale University Press, 2018): 188-9.

Revolution, Marxist analysts illustrate multinational corporations as protagonists of capitalist strategies. In these narratives, multinational corporations function as representations of capital, which penetrated markets of so-called developing countries to exercise control. These frameworks portray a one-sided and pessimistic image of multinational corporations in the world economy.⁶³ However, these analyses are strong in stressing the political dimension of multinational corporations. Other authors understand private companies only in ‘technocratic terms’ as neutral providers of technological services—a perspective that appears to preclude further investigation.

By contrast, Marxist analyses are often more interested in the larger picture of capital flows in the global economy and lack historical precision about the activities of multinational corporations. This leads to a very unbalanced representation of multinational corporations in historical analyses and, moreover, to a lack of empirical insights into how multinational corporations cooperated with other actors as they expanded their activities to so-called developing countries.

Political scientist Kenneth A. Dahlberg provides an example for a Marxist analysis, which introduced an understanding of multinational corporations as “Trojan horses” of the Green Revolution. In his book, *Beyond the Green Revolution* (1979), Dahlberg acknowledged that multinational companies offered promising technologies such as fertilizers or pesticides, enabling farmers to increase their productivity. However, he stressed that farmers adopting capital-intensive technologies inevitably encountered debt and thus started to be dependent upon the capital market. While the production costs heavily burdened the farmer, he argued, the profits shifted to the Global North.⁶⁴ These critical assessments share the assumptions of dependency theory—a theory to analyze the international economic system which was popular in Latin America in the 1960s and converges in many points with Marxist theories of

⁶³ Kenneth A. Dahlberg, *Beyond the Green Revolution: The Ecology and Politics of Global Agricultural Development* (New York, London: Plenum Press, 1979); Harry M. Cleaver, *The Origins of the Green Revolution* (Ann Arbor: Microfilm Publishing, 1974); Ross, *The Malthus factor*; Raj Patel, “The Long Green Revolution,” *Journal of Peasant Studies* 40, no. 1 (2013): 1–63.

⁶⁴ Dahlberg, *Beyond the Green Revolution*, 112.

CHAPTER I

imperialism. This school of thought aimed to explain the structural dependencies of so-called developing countries vis-à-vis their former colonizers.⁶⁵

According to dependency theorists, colonialism had unilaterally aligned the economies of colonized societies to the needs of colonial powers, thus blocking their development opportunities. For them, the unfavorable balance of power continued to exist even after decolonization, so that the former colonial regions continued to appear only as the economic periphery of the classic industrialized countries acting as ‘metropolises.’ Dependency theorists argued that multinational companies and their foreign investments destabilized the markets of so-called developing countries and subverted economic growth by ousting local business, using inappropriate techniques, and acting to worsen the global distribution of income.⁶⁶

In this dissertation, the Green Revolution does not present itself as a strategy planned in a center and then implemented in the periphery. Instead, complex networks of initiators unfolded, which also originated in so-called developing countries. My research shows that development policy-makers in these countries were interested in activities and investments of multinational corporations and their products. While Marxist analyses provide some important observations in terms of the international flow of investments, colonial continuities, and the centralization of most technological innovation processes, they fall short with their homogeneous depictions of multinational companies, overlooking the distinctiveness of agribusiness companies and their executives. To understand multinational corporations as agents in rural development, it is important to allow for a variation in the motives and experiences of corporate leaders who expanded their businesses in the so-called developing world.

By describing the rise of agribusiness as a ‘corollary’ to the process of capital accumulation, these scholars ascribed an artificial chronology to agrarian transformation processes. When the rise of agribusiness is described as the *consequence* of the penetration of capital, the process of

⁶⁵ Escobar, *Encountering development*, 447.

⁶⁶ Osvaldo Sunkel, “Big Business and ‘Dependencia’: A Latin American View,” *Foreign Affairs* 50, no. 3 (1972): 517–31; Ernest Feder, “Die neue Penetration der Landwirtschaften der unterentwickelten Länder durch die Industrienationen und ihre multinationalen Konzerne,” in *Multinationale Konzerne und Dritte Welt*, ed. Dieter Senghaas (Opladen: Westdeutscher Verlag, 1976): 110–15.

capital accumulation forfeits some of its important agents—multinational companies. Yet, capital by itself does not have agency and cannot decide to penetrate a certain sector of the economy. The false attribution of agency to the abstract category ‘capital’ is ahistorical and while criticizing agribusiness companies, Marxist analyses oftentimes exclude them as agents from their historical narratives, taking a bird eye perspective. Only investors such as corporate executives, government administrators, or farmers possess the decision-making ability to invest into a set of technologies. Thus, it appears plausible to understand the rise of agribusiness companies rather as the result of reciprocal relationships between state agents, development workers, farmers, and employees of private companies that had at times both diverging and common interests.

I am interested in the emergence of multinational corporations as global actors in the second half of the twentieth century. By exploring how multinational corporations operated in the efforts to raise agricultural productivity in the Green Revolution, I want to find out how they established their transnational business networks in the context of international development and how they positioned themselves in relation to governments and other public actors. My research illustrates ‘market liberalization’ as a very powerful and transient idea in the (rural) development discourse from the 1950s onward and shows that ‘liberal’ ideas had an impact earlier than the oft-quoted 1980s. By analyzing the global emergence of powerful private actors, this research can be understood as part of global history focusing on the ‘processes of globalization’ following the definition of Bruce Mazlish.⁶⁷ Looking at the Green Revolution through the lens of multinational corporations allows us to analyze the position of multinational corporations in the international constellation of actors contributing to rural development in the 1960s and 1970s and to see the extent to which they gained influence in rural areas in the Global South.

By focusing on multinational corporations and their executives’ relations to governments beyond national borders, I am following the transnational turn in international history—

⁶⁷ Bruce Mazlish and Ralph Buultjens, *Conceptualizing Global History* (Boulder, Oxford: Westview Press, 1993).

denaturalizing the nation-state as the unit of analysis. Transnational history questions “how people, ideas, institutions, cultures move beyond, beneath, through, around, as well as within the nation-state; it analyzes how well national borders comprise the history of people and explains how people experience their history.”⁶⁸ Consequently, my research understands multinational corporations as transnational actors that exchanged technology and knowledge beyond borders and cooperated with a diversity of state and non-state actors on a global scale.

My research presents the rise of a “transnational class of agribusiness” and the development campaigns of the Green Revolution as entangled phenomena. I argue that multinational corporations played an active role in the rural development policies commonly referred to as the Green Revolution and show that their home governments and other development actors promoted and supported their business operations abroad. This promotion and support facilitated the expansion of multinational business operations to emerging markets, which hesitant corporate actors perceived as difficult and risky. In this research, multinational corporations are not understood as passive beneficiaries of development policies, but as ‘agents’ that were actively participating in the project of ‘development’, understanding it as an opportunity to pursue their objectives, to realize their ideas, and to promote new approaches. Excluding corporate actors from the analyses of rural development in the 1960s and 1970s would create an artificial separation of development and foreign economic policies, although these domains were closely interrelated in the Cold War context. Multinational corporations could use development as a framework for business promotion in a context of various development policy-makers, such as the Rockefeller Foundation, US AID, or the Indian government, who understood corporations’ technological expertise and capital to be decisive for agricultural modernization.

STRUCTURE: BUNDLING THE GREEN REVOLUTION PACKAGE

The chapters of this dissertation follow all parts of the Green Revolution package, illustrated in figure 1, in chronological order, from the seed to be sown and fertilizer to let it thrive, to the

⁶⁸ David Thelen, “The Nation and Beyond: Transnational Perspectives on United States History,” *The Journal of American History* 86, no. 3 (1999): 965.

pesticides and other plant protection chemicals to fight diseases. This dissertation closes with the decision of chemical companies to invest in the seed business in the 1970s, when chemical corporations finally held all parts of the Green Revolution package. Following this structure, this dissertation analyses how the behavior of multinational corporations changed in international rural development from the Green Revolution in the 1960s, to a phase of upheaval in the 1970s, culminating in the turn towards a hegemony of liberal ideas in rural development and with multinational corporations as their key actors and proponents. In this process, I observe a trend from hesitantly operating corporations, to corporations receiving strong state support, to proactively operating corporations in the realm of rural development.

CHAPTER II: SOWING THE GREEN REVOLUTION (1957–1967)

Seeds in the Green Revolution received much attention: for example, the Mexican wheat varieties of Norman Borlaug and IR-8, the ‘miracle’ rice of IRRI gained astonishing popularity in research. However, this chapter is not so much concerned with wheat and rice; rather it focuses on maize. Maize, which offered possibilities of hybridization, was commercially traded in the United States from the 1920s onward. In the late 1950s, inspired by the success of hybrid maize varieties in the United States, officials of the Rockefeller Foundation promoted the commercial production and distribution of hybrid maize varieties in India and helped the US seed company DeKalb Genetics Corporation (DeKalb)⁶⁹ to establish business in India. DeKalb was hesitant to expand in a risky market and relied on much support of (especially) the Rockefeller Foundation and US AID in the late 1950s and early 1960s. Thus, analyzing the history of DeKalb’s seed business in India covers a philanthropic-government-corporate network that reveals a preference for market-oriented approaches to agricultural development. In this network, DeKalb found partners in the realm of rural and agricultural development who were willing to establish business contacts and carry the risks of their investments. The US government and the Rockefeller Foundation supported DeKalb as a presumingly indispensable

⁶⁹ Formerly, DeKalb Agricultural Association. Today, DeKalb is a seed subsidiary of Monsanto Company, a subsidiary of the German company BAYER.

CHAPTER I

expert. Furthermore, DeKalb's story documents the origins of the commodification of seed in India including the establishments of a legal framework for intellectual property rights on seed.

CHAPTER III: FERTILIZING THE GREEN REVOLUTION (1955–1970)

The seed of the Green Revolution proved more productive than traditional varieties only when applied with high doses of capital-intensive chemical fertilizers. In some cases, governments promoted the business activities of their multinational corporations as part of their 'development aid' programs. 'Tying of aid' by donor countries to serve the interests of national corporations was common in the bidding contests for the construction of fertilizer plants in India which are taken as an example of how business and export interests translated into development policies. Through the lens of the German engineering corporation *Uhde Ingenieurbüro* and the US American India Fertilizer consortium under the leadership of *Bechtel*, I show that development aid at times facilitated, and at times complicated, the bidding contests.

This chapter discusses the important role of fertilizers for rural development schemes; fertilizers opened rural development to an industrial logic of factories, to simplified models of supply and demand. Planners increasingly followed a simple logic of demand and supply: the more fertilizer available and applied on the field, the more food cultivators were able to produce. Furthermore, I argue that through fertilizers planners sought to bring 'modernity' to the fields. In reality, however, the distribution of fertilizers to Indian fields was a more complicated mission than illustrated in the abstract and simplified economic models.

CHAPTER IV: DIFFUSING PESTICIDES (1965–1970)

In order to supply the full package of inputs, including plant protection chemicals, international organizations, development agencies, and governments of so-called developing countries were dependent on the supply and technical expertise of multinational corporations. Chapter 3 discusses collaborations among private and public actors and turns to proactive corporations in the realm of development aid. It is interested in the institutional ties and examines three cases

of Public-Private Partnerships (PPPs)⁷⁰ with chemical corporations: first, with an international organization (the FAO); second, with a home government (the United States); and third, with a government in a so-called developing country (Indonesia).

This chapter stresses how lobby efforts institutionalized in the 1960s and analyses the initiation and development in the US Agribusiness Council and FAO's Industry Cooperative Programme, both founded in the late 1960s. For today's United Nations, PPPs are an established instrument of development cooperation, but in the Cold War context of the 1960s and 1970s, this collaboration in development work in the United Nations was not self-evident and ideologically contested by the two power blocs. The FAO hoped to profit from the financial means and managerial expertise of corporate leaders, yet the business community proved to be very hesitant to commit their resources to the FAO. Cooperation was more successful on a national level as the US Agribusiness Council can show, which exists still today. This institution understood agricultural development primarily as a business opportunity and tried to initiate projects that were profitable for the corporations. Furthermore, US development agencies had more funds available than the FAO. Comparing the two initiatives, I discuss the clear focus of business leaders on commercially lucrative projects.

In the third case, I examine how the collaboration of Ciba and the Indonesian government played out on the ground, in a rice improvement scheme called the *Ciba-Bimas Gotong Royong* project (1967–1969). The Indonesian government had contracted the Swiss corporation Ciba to modernize rice production in Java. While military personnel were responsible for the distribution of seed and fertilizer packages to farmers in Java, Ciba's employees trained farmers

⁷⁰ It is important to mention that the terminology of PPPs only established itself in the 1990s as a commonly known concept. Hence, the PPPs I examine pioneer a later trend toward intersector collaboration. In this dissertation, PPPs are defined as “any joint effort between public and private entities in which each contributes to planning, commits resources, shares risks and benefits, and conducts activities to accomplish a mutual objective.” David J. Spielman and Klaus von Grebmer, “Public–Private Partnerships in International Agricultural Research: An Analysis of Constraints,” *The Journal of Technology Transfer* 31, no. 2 (2006): 292.

CHAPTER I

to plant and to fertilize the seed, and undertook all the necessary insecticide spraying from an aircraft. In return, farmers had to hand over one sixth of their harvest to government agencies.⁷¹

CHAPTER V: SHIFTING FROM THE GREEN TO THE GENE REVOLUTION (1970s)

Chapter 5 focuses on the public environmental and anti-corporate pressure exerted in the late 1960s and early 1970s and analyses corporate reactions. Public opinion turned against multinational corporations and their products because of their intrusive and environment-damaging role in rural development. This criticism resulted in regulatory regimes that some corporations opposed and other corporations tried to influence. This chapter discusses counter-reactions to these public pressures in terms of public relations campaigns, and the use of lobby structures such as the ICP to repel environmental regulations. Against this background, this chapter discusses the decision of chemical corporations to invest in seed as a technological response to environmental criticisms. Becoming dominant actors in seed research activities in the 1970s, multinational corporations were able to emerge stronger in the realm of agricultural research and development than before. Finally, I set these developments in the context of changing rural development doctrines of the 1970s and the increasingly powerful role of multinational corporations in (neo-) liberal development ideas.

METHODOLOGICAL CONSIDERATIONS

"I don't dare write about these companies," a historian confided in a panel at a conference in the United States. His fear of financially ruinous lawsuits was too great. I was startled. That thought had never occurred to me before—*am I that naive?* His confession evoked the image of multinational companies as overpowering, corrupt colossi, engaged in criminal behavior from the outset, simply because they have the means to disguise it. Whether this picture is right or wrong is not the subject of my research. It is not the goal to write about multinational corporations as villains or do investigate journalistic work about them. Rather, my imperative is to include multinational corporations in historical narratives and not to exclude them from the

⁷¹ Ingrid Palmer, *How revolutionary is the Green Revolution?* (London: Voluntary Committee on Overseas Aid and Development, 1972): 8–9.

outset because of their inaccessibility. I am convinced that in view of their economic dominance and influence, we fail to tell a full story if we as historians exclude them. Historians need to approach them like any other actor or institution: with academic accuracy and an independent view.

This does not mean that researching multinational corporations—especially in the plural—went without a hitch. In contrast to other actors of the Green Revolution, the activities of multinational corporations are not systematically recorded and the analyses of my work are based on very dispersed, fragmented material. Rural development, in particular, was hardly the focus of entrepreneurs' attention at the time. They shared the contemporary preference for large-scale industrial projects. 'Big Business' took place in other industries like the pharmaceutical or the dye industry—not in agriculture. Hence, I encountered a difficult scarcity of material, especially in corporate archives. Consequently, in this work, I resorted to archives of other actors of the Green Revolution such as the Food and Agriculture Organization or the Rockefeller Archive Center to find out more about corporate activities. The large number of archives meant that I was confronted with an abundance of material, but very little of it was meaningful, or suitable for developing a narrative.

The accessibility of corporate archives varied from 'non-existent' to 'relatively open'. However, due to the pre-selection of documents handed out in the archives, the access was rarely satisfying. No archive can tell a complete story, but corporate archives are particularly selective. Nonetheless, it is important to mention and to stress that there is a big difference in the accessibility of material between European and US American corporate archives. The US corporate collections catalogued most often the already-published documents far better than the internal debates of the corporation or its business activities. In this kind of material, I did not find out anything about the relationships of corporate leaders with development institutions. European archives contain larger and more diverse collections. Nonetheless, except for Bayer, German-speaking companies in Switzerland and Germany (where most of my corporate material came from) did not grant access to the catalogues of their collections; historical researchers are fully dependent on the choice of archivists. As a researcher with the ambition to uncover the complexities of a story, this was often frustrating and I doubted that I could meet my academic standards.

CHAPTER I

For researching the parts of the Green Revolution package, seed and agrichemicals, I included material from the following archives: *Bayer Archives*, Leverkusen; *BASF Archives*, Ludwigshafen; *Hoechst Archives*, Frankfurt; *Novartis Archives*, Basel; the Monsanto collection held by the *Washington University Library* in St. Louis, Missouri; the Dow Chemical collection of the *Othmer Library*, in Philadelphia, Pennsylvania; and the DuPont collection of the *Hagley Library*, in Wilmington, Delaware. The archival collection of the British *Imperial Chemical Industry* was apparently lost with the dissolution of the corporation.

Considering the indispensability of fertilizers to the take-off of the Green Revolution, scholars have paid astonishingly little attention to the role of the fertilizer industry. On the one hand, research on the fertilizer industry was as rare in the 1960s and 1970s as it is now. On the other hand, historians perpetuate the bias in literature by focusing on seed research and pay little attention to the fertilizer industry's impact on (development) policy-making. My research was not only complicated by the lack of secondary literature, but also by the resistance and disinterest of today's fertilizer corporations to become subjects of historical research. None of the fertilizer corporations I contacted granted me access to their archival collection and most did not even reply to my requests. Former fertilizer corporations such as BASF, Bayer, and Hoechst, whose archives I worked with, opened material, which unfortunately lacked significance. In the case of the German corporation *K+S AG* (formerly *Kali und Salz GmbH*) I was able to get access to a collection at the *Hessisches Wirtschaftsarchiv* in Darmstadt, but this collection covers only the mining history of the corporation. Fortunately, the steel corporation *ThyssenKrupp* granted me access to their collection of their engineering subsidiary *Uhde Ingenieurbüro* (today *ThyssenKrupp Industrial Solutions*), which documented the construction of fertilizer manufacturing facilities in India, used for a short case study in chapter 3. Thereby, I circumvented the inaccessibility of archives of fertilizer companies partly by including engineering corporations that were active in the construction of fertilizer factories in so-called developing countries, but not in fertilizer trade.

In short, this dissertation includes case studies from different agribusiness sectors in the Green Revolution of the 1960s and 1970s. It focuses on the interactions with governmental and philanthropic actors as well as international organizations and shows multinational corporations as part of a larger network of actors disseminating the Green Revolution technologies.

CHAPTER II

SOWING THE GREEN REVOLUTION IN INDIA (1957-1967)

In the introduction, I explained how scholars commonly describe the introduction and widespread distribution of new varieties of wheat, rice, and maize as the vehicle of change of the Green Revolution of the 1960s and 1970s. A seed grain stored the results and successes of the scientific breeding experiments to make previous varieties of grain more responsive to fertilizers and more resistant to plant diseases. The breeding successes in high-yielding seed varieties were the results of research at the International Maize and Wheat Improvement Center (CYMMIT) and International Rice Research Institute (IRRI), international research institutes, which specialized in maize and wheat, and rice, respectively. The philanthropic Rockefeller Foundation and Ford Foundation sponsored these institutes. The term ‘Green Revolution’ refers to the seeds’ rapid increases in agricultural productivity and highlights the high speed with which the improved varieties spread in the so-called developing world—an operation that potentially required professional management, experienced personnel, and an elaborate infrastructure.

Compared to the research activities of the international research centers, these seed multiplication and distribution systems have received considerably less attention. This chapter scrutinizes the pathways India took to produce sufficient amounts of seed and to make the seeds available to the cultivators. It examines the origins of the National Seed Corporation, which was set up in 1961 with the support, funding, and consulting of the Rockefeller Foundation to create a commercially organized, profit-oriented maize seed market in India. Looking more closely at the history of this corporation, an interesting philanthropic-governmental-corporate network comes to light, in which the philanthropic Rockefeller Foundation acted similarly to a chamber of commerce promoting US business interests abroad.

Similar to much other Green Revolution research, the empirical evidence presented in this chapter comes mainly from the Rockefeller Archive Center. Therefore, this story inevitably revolves around philanthropic activities. Nonetheless, highlighting the Rockefeller Foundation’s activities in business development allows inquiry into their philanthropic motives.

CHAPTER II

Although many Rockefeller officials were New Dealers and, consequently, in favor of state control to foster economic development, these ideas were contested within the foundation. Other Rockefeller officers trusted in liberal-capitalist, market-oriented ideas, which laid the foundation for this philanthropic-corporate cooperation in the seed market. These officers trusted in market forces and competition as an organizing principle and perceived (especially US) multinational corporations as the most effective agents of change for interventions in India's food policies. The case of the establishment of the maize market in India enables us first, to examine the relationship between various development policy actors and multinational companies, secondly, their scope for action and motives, and thirdly, market liberalization processes in the context of development policies in the late 1950s and early 1960s. Scrutinizing the market entry of US American seed companies such as DeKalb in the late 1950s, I ask: which alliances were formed to allow DeKalb to enter the Indian seed market?

HISTORICAL CONTEXT

In the late 1950s, the Rockefeller Foundation started to establish a private seed market. Simultaneously, India shifted into the public eye in the United States and the investment climate for foreign corporations changed drastically. In the following, I briefly contextualize the changing landscape of US foreign aid to India.

When India with its 350 million inhabitants gained independence in 1947, it was the most populated and largest among the soon-to-be decolonized nations. At the time, India experienced high levels of poverty—as much in the urban centers (such as Calcutta) as in rural areas where the majority of the population lived. After witnessing the Bengal famine in 1943, which caused millions of deaths under British rule, it was an issue of moral and political legitimacy for its first Prime Minister Jawaharlal Nehru that this ought never to happen again in an independent India. With the experience of a large famine, providing sufficient amounts of food grains for India's population was the basis of his legitimacy. Hence, there was a strong interdependence of rising food production and the autonomy of the Indian nation.

Firstly, Nehru relied on the 'Grow More Food' campaign to increase India's food supplies, which was formerly initiated under British Rule in 1943. The program provided modern, productive inputs, seed, fertilizer, farm tools, and irrigation. To strengthen the campaign, the

SOWING THE GREEN REVOLUTION IN INDIA (1957-1967)

Government of India initiated investments in large irrigation projects that aimed to bring 16.5 million acres of farmland under irrigation. After 1949, policies of the campaign included land reclamation to increase cultivated areas and the provision of technical advice and credits to farmers for the purchase of fertilizers and improved seeds. In 1950, Nehru could not keep his promise of food sufficiency and faced a serious food shortage with hundreds of deaths.⁷²

Nehru continued to support agricultural and rural development: In India's first five-year plan from 1951–56, the largest share, 43 per cent of spending, went to agricultural and rural development. While the plan included nationalization of the means of production of the largest industries, it did not include land reform to change the highly unequal patterns of land ownership in rural India.⁷³ Instead of changing the unequal patterns of ownership, Nehru launched the Community Development Programme (CDP) in 1952. The program targeted the Indian village to improve the social and economic conditions of the rural population by means of self-help. It included investments in infrastructure, education, and health care. The aim of the CDP was socio-economic modernization within the framework of a nation building process with changes starting at the local level.⁷⁴ The CDP included 55 community projects for more than 17,000 villages. Within 10 years, it aimed to cover 500,000 villages. It called upon state parliaments to enact legal ceilings on landownership and to redistribute surplus to the poor. Furthermore, it promoted service cooperatives to purchase equipment and supplies and installed democratically elected panchayats—local village committees.⁷⁵

However, in India's complex rural settings, Community Development policies did not play out as projected. Strong interest groups and social traditions determined rural social conditions and the dissemination of income. For example, a government study on the CDP found in 1957 that 70 per cent of all distributed inputs such as seeds, tools, fertilizer, and irrigation had gone to the

⁷² Dennis Joseph Merrill, *Bread and the Ballot: The United States and India's Economic Development, 1947–1963* (Chapel Hill: University of North Carolina Press, 1990): 14–6, 26, 32.

⁷³ Merrill, *Bread and the Ballot*, 81.

⁷⁴ Corinna R. Unger, *Entwicklungspfade in Indien: Eine internationale Geschichte 1947-1980* (Göttingen: Wallstein Verlag, 2015): 43–44.

⁷⁵ Merrill, *Bread and the Ballot*, 92.

CHAPTER II

most affluent farmers.⁷⁶ Nonetheless, the CDP appeared to be very successful in the first years in terms of yields. Projecting further productivity increases through the CDP, the Government of India paid more attention to the industrial than the agricultural sector in the second plan. However, in the course of the second plan, from 1956–61, food production had to double to cover India's rising food needs. Yet the plan had foreseen only an increase of 15 per cent. This was not the only shortcoming of the second plan. India was not only running short in food supplies but also in foreign currency, requiring US\$700 million to US\$1 billion assistance to cover rising military and import expenses for capital goods such as steel. Consequently, in 1957, India was confronted with a foreign currency crisis.⁷⁷ With India's dependency on foreign exchange and imports, foreign governments acquired greater advantage to change Indian domestic policies. Nehru was highly distrustful of foreign aid used by the Soviet Union and the United States to achieve their interests attempting to draw India, as a bloc-free country, to either the Soviet or the Western camp. Yet India sought economic aid; its absence would have proven disastrous.

The cooperation between India and the United States slowly intensified with the expansion of US American 'food aid.' In 1949, an oversupply of wheat on the world market caused commodity prices to fall. In order to cease the effects on US American farmers, the US started to buy large amounts of the commodity to keep prices high. Every day, the Commodity Credit Corporation bought wheat for US\$1 million from US farmers, which it had to store to avoid deflating prices. Beginning in 1951, under the Agricultural Trade and Assistance Act, the US began to send surplus agricultural commodities to India, which initially planned not to exceed a volume of US\$65 million per year. Yet, the volume of food shipped to India increased rapidly. In the beginning, food aid took the form of barter deals: the Indian and US governments exchanged wheat and manganese. The terms of these barter deals were far better for the United States than for India, since the former got rid of a surplus commodity whose storage was very expensive in exchange for a raw material that it urgently needed for the production of steel.

⁷⁶ Merrill, *Bread and the Ballot*, 163.

⁷⁷ Merrill, *Bread and the Ballot*, 125–26.

SOWING THE GREEN REVOLUTION IN INDIA (1957-1967)

India, on the other hand, exchanged a raw material which otherwise could have been sold to receive scarce foreign currency which was urgently needed for the import of capital goods.⁷⁸

The US Congress first extended the agreements in 1954 with the creation of public law 480 (PL 480). This law turned the barter deals into grains sales to ‘friendly’ nations in local currencies and into donations for famine relief abroad and in the United States. Thus, a law created as a disposal program turned into a program for economic aid. Yet, PL 480 remained a good trade deal for the United States. From 1956 to 1963, under PL 480, the US sent agricultural commodities to India with a volume of US\$2 billion. To visualize it: this meant a shipload of wheat arrived in an Indian harbor every day during these 7 years. In this context, the United States increasingly used food as a diplomatic tool to enforce liberal investment policies in India.⁷⁹ Moreover, food assistance as a ‘cushion’ allowed India’s government to avoid hard policy choices such as implementation of land reform or adoption of market-oriented price incentives to secure food supplies. Because of the cheaply available food imports, food prices remained low in India. In a situation of low prices for their produce, cultivators remained hesitant to invest in agricultural technologies such as fertilizers and pesticides. Consequently, agricultural production in India rose only slowly, and the conditions of the predominantly rural population remained difficult, despite diverse Indian policies targeting this rural population with the aim of improving their situation.

Meanwhile, in the course of the 1950s, the image of and the attention paid to India in the United States changed so rapidly that by the late 1950s India had a dominant position in the development discourse. Indian development turned into a reference point of public aid debates and a testing ground to demonstrate a Western liberal path to improved standards of living. This focus on India had several reasons, such as its size and importance as the world’s largest democracy with high international stature and its impact as a role model for African and Asian states as one of the first countries to achieve independence. With its size and influence, the US found in India a showcase model to counterweight the communist model of development

⁷⁸ Merrill, *Bread and the Ballot*, 43–44, 60, 109.

⁷⁹ Merrill, *Bread and the Ballot*, 3, 20, 36, 43–44, 60, 109.

CHAPTER II

demonstrated in China. In the view of US foreign policy-makers, India was an adequate example for a peaceful transformation process toward economic progress without revolutionary excess.⁸⁰ Because India's development was thought to have important ramifications in other regions of the world, India became one of the largest recipients of US American economic aid in the 1960s.

The US and India had diverging visions of economic development and the influence of foreign corporations. They disagreed on development doctrines in terms of what development meant, how fast it should happen, and who should benefit from economic changes. On the one hand, US American leaders foregrounded their altruistic fight against poverty, although Cold War power categories determined much of the reasoning on possible aid interventions in India. They designed US economic aid to help maintain their own position of power and protect their national security and business interests. This was also necessary to defend foreign aid in their domestic development discourse, in which different interest groups contested the usefulness of economic aid and weight it against other forms of military assistance.⁸¹ In the design of its policies, the US stressed its suspicion of big governments and was strongly committed to capitalist free enterprise. Its liberal development doctrine favored limited government intervention, stressed private enterprise, opened access for foreign investments, and promoted democratic self-determination.⁸²

On the other hand, after their colonial experiences with Great Britain, India's leaders feared economic penetration and the ambitions of the United States to dump their surplus goods on the Indian market or its usage as a lever to make India adopt certain policies. It was important to Nehru not to turn into the "plaything of others."⁸³ India, despite its democratic organizations, often preferred the socialist model of planning to liberal capitalism. Yet, in defending the

⁸⁰ Merrill, *Bread and the Ballot*, 146.

⁸¹ Merrill, *Bread and the Ballot*, 2, 6, 7; Cullather, *The Hungry World*.

⁸² The United States had a long history of promoting a liberal-capitalist order, as reflected in their imperial and colonial activities in the beginning of the twentieth century. Already in colonial contexts, the US government promoted and regulated overseas development with the aim of protecting business interests. Merrill, *Bread and the Ballot*, 7–8.

⁸³ Jawarahal Nehru, as quoted by Merrill, *Bread and the Ballot*, 15.

socialist model, Prime Minister Jawaharlal Nehru's rhetoric proved to be more radical than his actions. From the beginning, private enterprise played a role in Nehru's model of a 'mixed economy.' He emphasized increasing production instead of redistributing wealth, by promoting industrialization and increases in productivity.⁸⁴ Hence, despite the Indian skepticism of foreign control through business, India's model was suitable for foreign investments, especially after some important legal and political adaptations in 1959 which much easier for foreign companies to invest in India.

With the Development Loan Fund (DLF), which was part of US President Dwight D. Eisenhower's Mutual Security Program in 1957, American foreign policy shifted visibly to a stronger focus on economic assistance programs. Part of the legislation undergirding the DLF encouraged recipient nations to issue investment guarantees against currency inconvertibility and nationalization of foreign firms. In the context of the foreign currency crisis and under financial pressure, the Indian government agreed to this legislation. In 1959, it promised to compensate foreign firms in the advent of nationalization. This was an important step for US corporations, whose executives remembered well the nationalizations in the aftermath of India's independence. News of improving investment conditions led to four official trade missions to scout the Indian market between 1958 and 1961. Foreign private investment doubled between 1957 and 1959 and reached US\$200 million in 1959. The United States replaced the United Kingdom thereby as the largest source of foreign private investments.⁸⁵

In addition to the political significance of an intensified commitment in India, US foreign policy-makers saw the opportunity to open up new sales markets for American companies. In this context and with this new US focus on India, aid generally increased with significant transfers

⁸⁴ Merrill, *Bread and the Ballot*, 161.

⁸⁵ In 1948, the Government of India ratified an Industrial Resolution, by which the Indian state took over ownership of the key industries. The resolution of 1948 forbid foreign investors to own a part of an Indian company. In 1957, this policy changed, allowing specific industries (for example pharmaceutical companies) to hold larger shares. In 1959, the Indian government reversed earlier policies regarding foreign oil firms, agreeing to full refinery concessions to Stanvac and Caltex. Based on these policy changes, US media reported that the Indian government was giving foreign private investors the chance they had been hoping for. Merrill, *Bread and the Ballot*, 160–61.

CHAPTER II

to the private sector. For example, the Export-Import Bank, a US investment bank, gave almost three quarter of credits to private firms. In this time, the Rockefeller Foundation also became increasingly active in India.⁸⁶

The Rockefeller Foundation's experience in rural development dated back to the 1920s. In this decade, it sent health and agricultural experts to rural areas in Asia, Africa, and Latin America to take preventive measures to reduce the spread of disease and increase agricultural production. In the 1940s and 1950s, its commitment to agricultural development focused mostly on Mexico, Chile and Colombia. In India, the Rockefeller Foundation became active again in 1953–54 in the context of decolonization, which served as an opportunity and justification for an involvement in South Asia's food economy. The contemporary assumption that population growth in India was dramatically accelerating reinforced its aspirations. Traditionally, stabilizing the food situation was a government task. The Rockefeller Foundation, however, considered itself to have the better means and expertise to address the problem, due to its presumably wider scope for action and its relevant past experience in plant breeding and rural development.⁸⁷ Early in its intervention in India, the Rockefeller Foundation held talks with the Indian Council of Agricultural Research, an Indian research institution, on the possibility of growing maize varieties in India on a commercial basis starting in the early 1950s. It took several years for these ideas to become reality. Entering a formal memorandum of understanding with the Government of India on April 12, 1956, the Rockefeller Foundation launched the Indian maize program. Parallel to this, the Rockefeller Foundation started to fund a postgraduate school at the Indian Agricultural Research Institute in New Delhi, where it laid institutional foundations for what came to be known as the Green Revolution.⁸⁸ While the Green Revolution of the late

⁸⁶ Ibid.; Unger, *Entwicklungspfade in Indien*, 78.

⁸⁷ Unger, *Entwicklungspfade in Indien*, 105.

⁸⁸ Loveridge, "The Hungry Harvest," 122.

SOWING THE GREEN REVOLUTION IN INDIA (1957-1967)

1960s was concerned with rice and wheat, the early focus was on maize and sorghum.⁸⁹ Maize and sorghum, however, accounted for only a small proportion of food production in India.

The agricultural research conducted by the Rockefeller Foundation in collaboration with the Government of India initially focused on maize. Overall, the investments of the Rockefeller Foundation in India (only US\$7.9 million between 1953 and 1974) were low, compared to its perceived impact.⁹⁰ As part of the research project, Rockefeller officials sent US American hybrids to test farms across India. In 1961, these research efforts resulted in the release of four new hybrid varieties: Ganga 1, Ganga 101, Ranajit, and Deccan. Furthermore, the Rockefeller Foundation helped to establish a production and distribution for hybrid maize in order to make these new varieties accessible to farmers. It promoted production and distribution activities carried out by private companies in a competitive market environment.

As a fully new industry had to be built up from scratch, the Rockefeller Foundation tried to convince the Indian government to support the commercial approach to seed production and distribution. The Indian government was not disinclined to promote the distribution of hybrid maize in general, because hybrid maize had the potential to raise yields by at least 30 per cent with an adequate supply of fertilizers. Linked to the potentially rising yields in maize production, it was in the interests of the Indian government that cultivators had an adequate supply of high quality seed. Hence, the Indian government saw the cooperation with the Rockefeller Foundation in the promotion of improved seeds as an opportunity to increase India's agricultural production capacity significantly and to provide a better income for farmers.⁹¹ Because of this collaboration, the Government of India founded the National Seed Corporation in 1961.

⁸⁹ Guy B. Baird to K.C. Sodhia, "Maize," 06.01.1967, Folder 11, Box 2, Series I, Record Group (RG) 6.7 New Delhi Field Office, Rockefeller Foundation, Rockefeller Archive Center, Sleepy Hollow, NY.

⁹⁰ Jack Loveridge, "Between hunger and growth: pursuing rural development in Partition's aftermath, 1947–1957," *Contemporary South Asia* 25, no. 1 (2017): 168.

⁹¹ Ministry of Food and Agriculture, "Improved Agricultural Seeds With Emphasis on Hybrid Maize," 1960, Folder 446, Box 67, Subseries 8, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY ; Under Secretary, "Minutes of the Meeting of the Committee of Hybrid Maize Corporation held on Wednesday, the 3rd August 1960," 08.13.1960,

CHAPTER II

To summarize: towards the end of the 1950s, the political constellation in which philanthropic actors and multinational corporations operated changed. It altered with regard to India's public perception in the United States and its ascribed importance during the Cold War, as well as the power imbalance between the India and the United States in the context of a foreign currency crisis. Because of this crisis, India had difficulties in providing sufficient funds for rural development. The United States pressured India to improve investment conditions for US companies. This constellation gave the Rockefeller Foundation the opportunity to expand its scope of action in India and establish itself in seed research and marketing. Moreover, it opened an opportunity for the US seed company, DeKalb, to expand to a new market. In the context of the battle of ideologies during the Cold War, and with the support of a philanthropic actor, the company was able to formulate this market expansion according to the ideals of spreading a liberal-capitalist world order.

ESTABLISHMENT OF A PRIVATE SEED INDUSTRY IN INDIA, (1956–1967)

The following section describes the foundation of the National Seed Corporation as an attempt to privatize seed production. The National Seed Corporation targeted the production of foundation seeds of hybrid corn to sell it to private multiplication farms. The Rockefeller Foundation initiated its foundation and established contacts between the Indian government and US seed companies.

Traditionally, until the foundation of the National Seed Corporation in 1961, seed multiplication and distribution had been organized and executed by the Indian government and not by private markets. For example, as part of the CDP initiated in 1952, the government established a seed multiplication system for self-pollinating crops that was committed to a decentralized network of more than 2,000 state-owned block seed farms on the village level. First, some state farms multiplied foundation seed of some important varieties and then, second, they handed them out to registered growers for further increases. The Department of Agriculture purchased the seed back from the growers and channeled it through departmental agencies for sale to the cultivators.

Folder 433, Box 65, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

SOWING THE GREEN REVOLUTION IN INDIA (1957-1967)

This system was, however, not suitable for the multiplication of maize hybrid seeds, since it required a fundamentally different approach.

Hybrid seed production needed isolated multiplication, requiring specialized know-how and larger plots of land than the 50 acres of block seed farms, and could not (other than self-pollinating varieties) be propagated by farmers or the block seed farms. The promoted hybrids had a superior productivity through an effect called ‘hybrid vigor’ which lasted only for one generation. Later generations did not show this effect of higher productivity. The Rockefeller Foundation initiated the creation of the National Seed Corporation, equipped with sufficiently large plots of lands for isolated propagation. Internally, the Rockefeller Foundation discussed the National Seed Corporation as an opportunity to create a reliable source of foundation seed not only for hybrids but also of self-pollinating varieties for sale on private commercial markets.

In October 1959, in collaboration with the Indian Council of Agricultural Research, the Rockefeller Foundation formed a sub-Committee that developed schemes for the commercial production of hybrid maize seed. The sub-committee consisted of members of the Government of India, its extension service, agricultural research institutes and the Rockefeller Foundation. One member was Captain Rattan Singh from the Punjab, who was an important partner of US seed businesses at a later point in time. The sub-committee declared that the Rockefeller Foundation had to provide extensive means for organizing and promoting the commercial production of hybrid maize seed: the National Seed Corporation. The commitments of the Rockefeller Foundation included making a specialist available to draft a proposal, and funding the equipment the corporation needed for the production of foundation seed. If the Rockefeller Foundation was not able or willing to participate or to fund the investments, the Government of India would have reached out to other agencies such as the Ford Foundation—apparently, a preferable partner. At this point, the competition between the foundations was rather unbalanced, since the Ford Foundation’s investments in Indian rural development tied to the CDP had been considerably larger. Hence, while the Government of India granted much influence to the Rockefeller Foundation in the design of commercial seed production and

CHAPTER II

distribution, it also exploited the competition between the foundations in order to gain substantial investments in the project.⁹²

The Rockefeller Foundation played an important part to commercialize seed trade and multiplication in India. For introducing seed as a marketable good, the Rockefeller Foundation did not only demand the re-organization of seed multiplication, but also changes to the legal framework in terms of a Seed Law. The Rockefeller officials found this to be necessary because seeds were visually not differentiable from grain. Hence, in order to make seed efficiently marketable, the Rockefeller Foundation argued in favor of labels and certificates. These certification processes required state legislation. Even before the release of their new varieties in 1961, the Rockefeller Foundation wrote a first draft of an Indian Seed Law to be introduced, in adapted form, in 1966. Therefore, efforts to convince the Indian government of the necessity of seed certification started as early as Rockefeller's investments in maize seed research in 1956, and before the ideas of an organization for the production of high-quality, hybrid seed was effectively promoted in 1959. For this, the Rockefeller Foundation was in close contact with the US Embassy in India to discuss the best possible design of a seed law abroad. For Rockefeller officials, it was important that the legal framework would not only be valid for maize, but expandable to other crops at a later point in time. It was their explicit aim to later broaden the concept of the seed program—commercial production and distribution—to other self-pollinating crops beyond maize. In 1957, however, Rockefeller officials perceived a general seed law as existed in the United States to be virtually impossible.

Nonetheless, Ralph W. Cummings reached out to several of his colleagues in Crop Improvement Associations and at universities to gather information on seed certification, seed legislation and seed law enforcement in the United States. He was a soil and agricultural scientist who worked for the Rockefeller Foundation and the head of the Indian Agricultural Research Institute (IARI)

⁹² Indian Council of Agricultural Research, "Scheme for the production of Hybrid Maize Seed on Commercial Lines - Consideration of by Sub-Committee," 10.03.1959, Folder 407, Box 62, Series III, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; J. V. A. Nehemiah to Ralph W. Cummings, "Support Rockefeller Distribution of seed," 10.07.1959, Folder 407, Box 62, Series III, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

from 1957 onwards. He and his colleagues suggested a seed law for India that followed the US American model. Thus, the Rockefeller officials promoted US American ideas of a deregulated seed market that informed the design of the Indian Seed Law, implemented in 1966. Yet, the Indian seed law of 1966 resembled European seed laws concerning state controls in the approval of new varieties.

The design of this seed law—necessary to allow for proprietary control of seed—was not the mere result of foreign intervention. It also increased the power of the Indian government to decide which plants were to be grown in India's agriculture. The Government of India argued that the law was a way to protect farmers' rights; without government interventions, the farmer apparently lost the means of control over the quality of the seed he planted.⁹³ The Rockefeller Foundation and the US government tried to gain influence on Indian legal structures to make them more conform to their ideas of an ideal market and organization of agricultural production. They aimed at changing the fundamentals of agricultural production by changing the trade of seeds. Seeds had used to be freely accessible as a reproducible public good. Their goal was to transform this public good into a commodity that could be profitably traded on a market.

For the Rockefeller Foundation, the certification process realized through the introduction of a seed law was the basis of a private seed market—the private sector should be responsible for a certified seed production, either through cooperatives, individuals, private companies, or through all three. In the Rockefeller Foundation's view, in order to reduce the cost of seed to the cultivator, the Indian government were to establish a liberal market based on certified seed production as a self-supporting enterprise without government subsidies. In the initial phase, it

⁹³ Harold W. Hannah to Loren Davis, "Seed Law," 05.20.1957, Folder 432, Box 65, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; Ralph W. Cummings, "The Seed Stock Problem," 03.21.1959, Folder 407, Box 62, Series III, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; Ralph W. Cummings to Foil McLaughlin, "Letters about Seed Laws in the US," 05.25.1959, Folder 432, Box 65, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; A. A. Johnson to Ralph W. Cummings, "Seed Certification," 06.03.1959, Folder 432, Box 65, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; W. M. Myers to A. A. Johnson, "Seed Program"; Ministry of Food and Agriculture, "Improved Agricultural Seeds With Emphasis on Hybrid Maize."

CHAPTER II

envisaged the National Seed Corporation playing an important role in the establishment of this market. It should have financing and trade-stimulating responsibilities, but not become involved as an active or visible participant in the seed trade. Certified seed corporations set up by the National Seed Corporation should turn into independent corporations operating strictly within the private sector. Furthermore, these corporations should have a role model function, attracting other cooperatives and private companies to get involved into the seed business. Hence, in this way, the seed production would transit gradually from the public to the private sector. Lastly, breeding, production, and distribution of foundation seed had to remain a government function until a commercial seed business developed.

The Government of India (GOI) was partially skeptical about the idea of a commercial seed market and adapted the idea of a hybrid seed industry to their own agenda. Whilst the government approved to set up the National Seed Corporation in May 1961, some Indian administrators found the idea of selling seed at higher prices than grain unsuitable for the Indian market, since “what goes by the name of seed in the country is generally nothing better than grain.”⁹⁴ Furthermore, the GOI made clear that allowing some seed producers to directly market their own seed meant a radical change in the whole philosophy of seed multiplication in India.

The Rockefeller officials were convinced that the newly founded National Seed Corporation should have a predominantly promotional function, even to the expense of potential financial losses. The Indian finance department criticized this; financial administrators questioned the appropriateness of a policy, which would permit private businesses to reap the benefits of public research. In their view, there was no room for a public company to run on a loss while private businesses took its profits.⁹⁵ Yet, the Government of India agreed to allow private growers to sell the hybrid varieties themselves, although their prices were then out of their control. Moreover, the government agreed to a fixed price for those producers who were not able or

⁹⁴ Government of India, “Outstanding points relating to the establishment of National Seed Corporation,” 1962, Folder 415, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

⁹⁵ Ralph W. Cummings, “Diary Notes,” 06.01.1966, Folder 255, Box 38, Series III Officers’ Diaries, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center; Sleepy Hollow, NY.

willing to sell their own seed and who wanted to use the government seed distribution channels for seed marketing.⁹⁶

In this way, the GOI appears to have supported the main purpose of the Seed Corporation to encourage and assist the private sector in the production and marketing of double-cross hybrid seeds. In short, the Rockefeller Foundation and the Government of India agreed on the following points: the production of foundation seed would probably remain in the hands of the National Seed Corporation, whilst competition would stimulate the seed industry. Independent seed certification agencies would be established and seed laws introduced. Furthermore, aggressive public educational and demonstration programs guided these policies.

Some key challenges accompanied the foundation of the National Seed Corporation. The production of foundation seeds required large plots of land due to corridors that needed to isolate hybrid maize fields. This was a difficult condition to meet in the context of loud calls for land reform, in which the Indian government tried to avoid large individual land holdings. The land ceiling acts on state levels restricted the acreage that could be under the ownership of a single individual. Accordingly, companies, especially foreign companies, could only own land for establishing headquarters and processing operations. They had to lease land for seed multiplication activities.⁹⁷ Furthermore, the central corporation was required to organize and train staff at the central, state, district, and block levels. The extension wing of the Ministry of Agriculture carried out large-scale demonstrations.⁹⁸

⁹⁶ Government of India, "Outstanding points relating to the establishment of National Seed Corporation."

⁹⁷ Government of India, "Prospectus for Foreign Seed Corporation - Interested in Considering the Establishment of Business Operations in India," 1964, Folder 417, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

⁹⁸ Rockefeller Foundation, "Conference on Seed Production and Distribution," 12.29.1959, Folder 407, Box 62, Series III, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; T. S. Pruthi, "Minutes of the Meeting held on Thursday, the 18th January 1960 to discuss the preliminaries for this setting up of corporation for developing the production of hybrid maize seeds," 01.28.1960, Folder 433, Box 65, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center; W. M. Myers to A. A. Johnson, "Seed Program," Folder 407, Box, 62, Subgroup I, Series III, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

CHAPTER II

Already before the Indian government gave its approval to the establishment of the National Seed Corporation, Rockefeller Foundation officers had reached out to their business contacts in the United States to find seed companies that were interested in investing in the Indian market. The Rockefeller Foundation introduced corporate executives to the particularities of the Indian market, sometimes also during visits in India. Cummings and his colleagues were convinced that experienced US corporations could play an important role in the establishment of a commercial seed industry in India. In a letter to Thomas M. Roberts, DeKalb's corporate executive officer, A. H. Mosemann, director for agricultural sciences at the Rockefeller Foundation headquarters in New York City, summarized:

[...] there are many of us who feel that private enterprise must be fostered in India to carry out such seed production and marketing services if the total needs of the country are to be met. We feel that reputable firms from the United States with the background of experience and the demonstrated integrity required for such an operation would find it possible to develop effective and eventually profitable operations in India.⁹⁹

DeKalb was the first company to collaborate closely with the Rockefeller Foundation in the establishment of an Indian seed market. As one of the largest seed companies at the time, DeKalb was one of the first companies Rockefeller Foundation officials approached to invest in the seed business in India in 1960. DeKalb was founded in 1923 in DeKalb, Illinois and had brought its first hybrid maize variety to the US American market in 1935. Bought by Monsanto in 1999 and named DeKalb Genetics Corporation, today, the DeKalb Agricultural Association turned into the major subsidiary of today's largest seed corporation.

A. H. Moseman of the Rockefeller Foundation contacted "Rus" Rasmusen, the vice-president of DeKalb and manager of its seed corn division. After Rasmusen had explored the opportunities of the Indian market himself during a trip to India, he sent an employee of DeKalb, B. S. Dhillon, to India and brought him in touch with Ralph W. Cummings. Dhillon grew up in India and received a training by DeKalb in the US for more than two years. DeKalb sent Dhillon to India to explore a possible set-up of an operation through the National Seed Corporation. DeKalb

⁹⁹ A. H. Moseman to Thomas M. Roberts, "Seed Corporation," 01.02.1962, Folder 410, Box 62, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

preferred to expand their business based on their own inbred lines of hybrids, but the Indian government opposed this idea and DeKalb began its operation by marketing hybrid lines bred by public and Rockefeller research.¹⁰⁰ However, Rasmusen saw the cooperation with the Rockefeller Foundation and the National Seed Corporation as only a springboard for more profitable business:

If DeKalb, or any other private company, were to start operation in India, I am sure it would be best to use all of the information and experience gained by the Rockefeller Foundation and by other research agencies, to use available foundation seed and to fit into the program as outlined. Later, if the private company decided it could make a contribution through extensive research of its own, it no doubt would ask the same questions I have raised [about own varieties].¹⁰¹

Rasmusen was also in close contact with A.A. Johnson, a professor of plant breeding at Cornell University, who worked for the Rockefeller Foundation in India for one year in 1960. Johnson's main activity in this year was to advise the Indian government on the design of a Seed Law and the National Seed Corporation. He wrote the so-called *Blue Book* for the National Seed Corporation outlining the basic ideas, objectives, and main features of its management. Back in the United States, he tried to use his close personal ties in India to promote DeKalb's interests in India.¹⁰²

Johnson saw a perfect moment for DeKalb to invest in India: high government officials in India recognized the urgency of the food crisis, hence the shifting of resources in the third five-year plan to improve agricultural production. Moreover, in Johnson's view, government officials would regard the development of a private seed industry favorably, as hybrid maize had "caught

¹⁰⁰ Ralph W. Cummings, "Diary Note," 05.01.1961, Box 37, Series III Officers' Diaries, Subgroup I, G 6.7 New Delhi Field Office, Rockefeller Archive Center; W. M. Myers to A. A. Johnson, "Report: Improved Agricultural Seeds," 09.08.1960, Folder 407, Box 62, Series III, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹⁰¹ R. N. Rasmusen to A. A. Johnson, "Business Interest in India," 06.07.1961, Folder 410, Box 62, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹⁰² A. A. Johnson to Ralph W. Cummings, "Setting Cummings and Rasmusen in touch," 06.15.1961, Folder 410, Box 62, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center.

CHAPTER II

the imagination of many influential people in India” as a way to make a major advance in food production. He stressed that “good Indian cultivators” were as good as anywhere in the world and willing to adopt new practices. He assured them of the support, cooperation, and encouragement of the Rockefeller Foundation and Ford Foundation, as well as the US embassy’s willingness to initiate a “forward looking program.” He exaggerated the meaning of DeKalb’s operation, either because of personal conviction or as a political strategy to advocate US business in India, and linked DeKalb’s operations to “India’s future as a Democratic country.” In his view, if DeKalb were to pioneer in the development of a “successful seed business,” it would make an important contribution in the transfer of technology for agriculture and in the solving of India’s food crisis.¹⁰³

Despite the apparently strong support of philanthropic actors, Rasmusen remained hesitant about starting an operation in India. He thought that his company would have to disregard its profit motive when investing in hybrid corn and sorghum in India. For him, the state of the market, the possibility of government subsidy for state-owned seed producers, and the possibility of the Indian government limiting profits posed major threats to DeKalb’s profit opportunities. Other foreign markets appeared to be more favorable. His supervisor, the head of the company, was even more skeptical about DeKalb investing in India. For him, the “risk capital” the company would have to invest was larger than it could justify.

When looking for the means to secure the risks of its investments, DeKalb argued that seed business was an area in which it “can make its own small contribution to the preservation of freedom in the world.”¹⁰⁴ DeKalb sold the expansion of its operations to India as a win-win situation for US AID: “The uses of hybrid seed will materially aid food production in India, thus serving the needs of that country as well as providing a US business firm the opportunity of

¹⁰³ A. A. Johnson to R. N. Rasmusen, “DeKalb in India,” 09.25.1961, Folder 410, Box 62, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹⁰⁴ R. N. Rasmusen to Agency for International Development, “Request Funding A.I.D.,” 01.23.1962, Folder 410, Box 62, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center.

establishing a business which on a long-time basis might yield profits.”¹⁰⁵ Hence, DeKalb sold its business expansion as a high priority foreign policy concern in a context in which India’s food security was moving into the center of attention of US foreign policy-makers. Stressing its political impact, DeKalb demanded financial support from the government or the Rockefeller Foundation. Without governmental support, as it expressed in communication with the Rockefeller Foundation, it would not invest.¹⁰⁶ Thus, before setting a foot in a new and potentially risky market, the corporation relied on the support of its government and the Rockefeller Foundation; it did not move as independently as one might have expected from a self-proclaimed ‘free-market actor’.¹⁰⁷

The United States had a broad array of measures at hand to support its businesses abroad. For example, the Rockefeller Foundation informed DeKalb about “substantial funds” available through Cooley loans granted out of PL 480—local currencies derived from sale of US surplus agricultural commodities. In 1957, the chair of the House Committee on Agriculture, Harold D. Cooley, had introduced and won this amendment to PL 480, an agricultural surplus disposal bill, mandating that up to 25 per cent of counterpart funds of surplus grain sales were available to United States operations overseas. This was a direct assistance to private corporations to nurture liberal-capitalist development.¹⁰⁸ Cooley loans supported a direct link between aid and

¹⁰⁵ R. N. Rasmusen to Agency for International Development, “Request Funding A.I.D.”

¹⁰⁶ Thomas M. Roberts to A. H. Moseman, “Risks of DeKalb,” 12.18.1961, Folder 410, Box 62, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow.

¹⁰⁷ R. N. Rasmusen to Agency for International Development, “Request Funding A.I.D.”; R. N. Rasmusen to Ralph W. Cummings, “A.I.D. loan - DeKalb- Cooley loan,” 01.04.1962, Folder 410, Box 62, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.; A. A. Johnson to J. George Harrar, “DeKalb Agricultural Association,” 02.13.1962, Folder 410, Box 62, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹⁰⁸ Merrill, *Bread and the Ballot*, 159.

CHAPTER II

private business; funds made with the sale of surplus commodities, described as ‘food aid’, funded US businesses abroad.¹⁰⁹

In the course of the exchange with the Rockefeller Foundation officials, Rasmusen refused to collaborate closely with Indian government agencies and declined loans granted by the National Seed Corporation. Here the irony of the corporation’s relationship to state institutions became apparent. The executives mistrusted Indian government agencies, but were open to US state subsidies. Therefore, Rasmusen applied informally for loans at Export-Import Bank and AID only.¹¹⁰

DEKALB IN INDIA, (1960–1967)

In the process of establishing the private seed market, some conflicts between US development agencies, the Government of India, and the Rockefeller Foundation arose. While US AID was willing to support DeKalb’s operations, Indian officials ultimately had the right to approve or reject DeKalb’s application for PL 480 funds. Hence, even without confirmation of possible funding opportunities, Rasmusen wanted to come to India to discuss the project with Indian officials in person and make a strong case for it. For this endeavor, DeKalb considered the Rockefeller Foundation to be an important partner, trusting its ability to exert favorable

¹⁰⁹ Government of India, “Prospectus for Foreign Seed Corporation - Interested in Considering the Establishment of Business Operations in India.”

¹¹⁰ In the informal application to US AID, DeKalb was asking for P.L. 480 funds for the first five years of its operation with a volume of US\$ 1.5 million. Repayment of the loans were to start after five years in 1967. The loans were to include *inter alia* funds for developing a sales and distribution organization to acquaint farmers with the advantages of hybrid seed corn. In the first year, funding was predicted to be entirely used for educational and promotional work such as demonstration plantings, field days, and advertising. Rasmusen intended to send two experienced employees from DeKalb and to employ five Indian assistants. Salaries would be by far the largest share of the costs, followed by seed, fertilizer, and advertising. Two US American employees would earn as much as five highly educated Indian assistants. A. A. Johnson to Ralph W. Cummings, “Funding of DeKalb Activities,” 12.14.1961, Folder 410, Box 62, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; A. A. Johnson, “Report: Improved Agricultural Seeds.”

influence in government circles, and to bring DeKalb in touch with key decision-making bodies.¹¹¹

The Rockefeller Foundation, especially Ralph W. Cummings, provided comprehensive support for Rasmusen and Balbir Dhillon on their trips to India. During Rasmusen's first trip, Cummings arranged numerous meetings with senior Indian politicians and organized field trips, which Cummings reflected upon in his diaries. For one trip, Cummings put Rasmusen in touch with the Secretary of Agriculture for Andhra Pradesh Rajeswara and the maize breeder Vittal Rao. Together with Dhillon, as a group, they made a 3.5-hour ride from Hyderabad to the village of Medapalli that included an off-road ride of two miles. In this village, a large group of local people greeted the delegation with decorated signs. A band played percussive music and people cheered "Hybrid Makka"—hybrid corn. The group was garlanded and carried up to a stage to speak to the villagers. Cummings found the hybrids grown in the fields of the village in good health and thought of this trip as a good demonstration of "what can be done if the village people are given the proper instruction, guidance, encouragement, the necessary credit and supplies."¹¹² Finally, they were welcomed to the home of K. N. Reddy, the head of the village, and served tea and refreshments made from hybrid maize. Cummings described this as a "tasty feast."¹¹³ This setting must have left quite an impression on Rasmusen. Thus, the collaboration with the Rockefeller Foundation allowed DeKalb's managers to experience India's agricultural production firsthand, and to connect with and win support from the people in charge of the Indian government.¹¹⁴

The Agricultural Association Ltd.—a joint venture of DeKalb and an Indian (Punjabi) company belonging to Captain Rattan Singh—was registered in November 1963. It was active in the production and marketing of hybrid corn, of which DeKalb held 5 per cent of the stock.

¹¹¹ A. A. Johnson to Ralph W. Cummings, "Funding of DeKalb Activities," 12.14.1961, Folder 410, Box 62, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; A. A. Johnson, "Report: Improved Agricultural Seeds."

¹¹² Ralph W. Cummings, "Diary Notes", 03.09/10.1962, 2.

¹¹³ *Ibid.*, 1.

¹¹⁴ *Ibid.*

CHAPTER II

Rasmusen had developed far-reaching plans to cooperate with Rattan Singh, who also used to be a member of the sub-committee working on the foundation of the National Seed Corporation, and in this context had been a strong promoter of the commercial seed market. He was willing to invest 150,000 rupees and to participate in buying 300 acres of land as a base of operation for the initial production. After his election to Parliament in 1962, Rattan Singh was no longer available for an active management post, but increased the sum he was willing to invest in the capital structure to 230,000 rupees. In order to find a replacement for Rattan Singh, the corporation wanted to employ members of the Rockefeller Foundation, such as Wayne H. Freeman, to work for the All India Maize Improvement Program. However, Cummings feared negative publicity on his impartiality, and opposed Freeman's change of jobs.¹¹⁵

DeKalb's employee Balbir Dhillon, who knew DeKalb's operation very well, was out of question from the beginning. Although he had several years of experience working for DeKalb in the United States, in the eyes of DeKalb's top management, he came from India and could therefore only work second rank. Dhillon started to work for the Agricultural Association but under the supervision of the US managing director of the Indian site Pete Olson. For DeKalb's executives and the Rockefeller Foundation, it was an unassailable principle that the managing director had to come from the United States. Consequently, the Rockefeller Foundation gave all leading positions of newly founded institutions in India to US citizens. This policy reflected the Rockefeller Foundation's conviction that newly founded institutions in so-called developing countries were reliant on foreign expertise until the training a sufficient number of scientists and experts were trained. Historian Corinna Unger points out how the attitude of the Rockefeller Foundation towards Indian workers was analogous to the arguments of the civilizing mission: Western experts ought to guide the learning process to become self-reliant.¹¹⁶ DeKalb acted with a similar attitude when it did not allow Dhillon to lead business. The considerations of both the

¹¹⁵ Ralph W. Cummings to A. H. Moseman, "DeKalb Agricultural Association," 11.11.1963, Folder 416, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹¹⁶ Unger, *Entwicklungspfade in Indien*, 108.

Rockefeller Foundation and DeKalb's management reflected a sense of superiority among US actors over Indian stakeholders, leading to conflicts within the US–Indian enterprise.¹¹⁷

For DeKalb the sales of the Agricultural Association were disappointing in the beginning, because the corporation was confronted with many problems in their marketing strategy, which Freeman described as false propaganda and lethargy. For example, he observed that government sales agencies did not give DeKalb hybrid maize seed much of a sales outlet. However, the two competing field managers of the Agricultural Association followed different approaches of bringing their improved varieties to the cultivator. They separated the state to find out who was more successful: while Dhillon relied on his contacts with block officers and cooperatives, his Indian counterpart who had a similar function in the Agricultural Association, Hari Raj, used a vehicle to get in touch with cultivators directly. Hari Raj tended to be more successful but sales rarely lasted for two seasons. Observing the difficulties of the extension work, Freeman understood the construction of a seed marketing system to be a complex endeavor that required “perseverance, persuasion, and perspiration”¹¹⁸ to succeed.

Freeman was convinced that the corporation would have to sell, firstly, the name of the company; secondly, its innovative seed distribution system; thirdly, its good practices of maize cultivation; and finally its seed—not only to its own staff, but also to government officials and cultivators. In this complex endeavor, Freeman offered Rockefeller Foundation staff to help with consulting, and staff trained by the Rockefeller Foundation for hiring at the new company. He prescribed a strong role in training and education of farmers to the corporations.

¹¹⁷ R. N. Rasmusen to Agency for International Development, “Request Funding A.I.D.”; R. N. Rasmusen to Ralph W. Cummings, “Application to AID,” 02.12.1962, Folder 410, Box 62, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; R. N. Rasmusen to Ralph W. Cummings, “Problems to set up business in India,” 03.29.1962, Folder 410, Box 62, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; W. H. Freeman and G. V. Chalam, “The Program Ahead,” 03.25.1963, Folder 415, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹¹⁸ Wayne H. Freeman to R. N. Rasmusen, “Report on DeKalb Executives,” 12.11.1963, Folder 416, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

CHAPTER II

Furthermore, he advised that new seed bags should carry the DeKalb emblem, promoting the idea of enhancing certification standards and making Indian buyers used to the idea of labeled seed.¹¹⁹ This approach was in line with the tradition US AID logos or US flags on aid products.

As soon as DeKalb had established business in India, other US American corporations became interested in doing business through the Rockefeller Foundation as well. Companies such as Asgrow Seed Company International and Cargill approached the Rockefeller Foundation to obtain further information on the Indian market. Freeman thought supporting DeKalb in India might pave the way for other companies in the future and initiated many collaborative activities reminiscent of a chamber of commerce. As Rockefeller officials saw US corporations as efficient and reliable partners, and promoted ideas of a healthy industry that ought to be private and competitive, they saw US companies in India as the key to the success for their operations.¹²⁰

The Rockefeller Foundation increasingly professionalized business promotion and the facilitation of business activities. In the beginning, Freeman contacted several seed businesses in the United States and Great Britain to promote their expansion to India. Observing the hesitancy of many corporations, Freeman suggested that the Government of India prepared a prospectus for companies, so that US companies would receive official answers and assurances. Furthermore, he wanted the government to become actively involved in promoting foreign direct investments and to send Indian officials to meetings of the US seed industry. The Rockefeller Foundation was willing to fund those trips. Yet many Indian administrators were skeptical. In

¹¹⁹ W. H. Freeman, "Visit Funk Bros. Seed Company," 12.02.1963, Folder 416, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; W. H. Freeman to Kendall Redfield, "DeKalb's Activity in India," 11.22.1963, Folder 416, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹²⁰ Freeman, "Visit Funk Bros. Seed Company", Folder 416, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; W. H. Freeman to Kendall Redfield, "DeKalb's Activity in India", Folder 416, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; Northrup King to Wayne H. Freeman, "Collaboration with Birla Brothers," 10.06.1964, Folder 417, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; M. S. Swaminathan to Wayne H. Freeman, "Jowar Seed Production," 01.31.1964, Folder 417, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

their view, private business would not be very successful in marketing seed, as state governments sold the bulk of seed in 1964.¹²¹ Confronted with this disinterest in their ideas, the Rockefeller Foundation drafted the prospectus for foreign investments itself whilst the Indian government was publishing it.¹²²

In the further course of the project, the relationship of trust between the Rockefeller Foundation and DeKalb experienced severe disruptions. On the one hand, DeKalb was upset about the Rockefeller Foundation collaborating with other foreign companies.¹²³ Cummings heard rumors about this, as DeKalb demanded exclusive franchise for the production of hybrids in its territory. Cummings, however, was strongly opposed to any kind of monopoly position, whether public or private. He was convinced that the development of a commercial seed industry had to have a competitive basis; otherwise, it would be difficult to convince the government to allow a commercial seed industry to develop.¹²⁴ While the Rockefeller Foundation assumed that DeKalb shared its conviction of the superiority of a free market economy, DeKalb demanded protection, preferential treatment, and support in the production and marketing of its own seed. Hence, the Rockefeller Foundation fought a lonely battle for competition in a free market economy.

¹²¹ Ralph W. Cummings to Shri. C Subramaniam, "Contact with Foreign Seed Companies," 12.26.1964, Folder 417, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; W. H. Freeman, "American Seed Companies and Their Interest In India," 09.04.1964, Folder 417, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; Y. R. Mehta to Ralph W. Cummings, "Disagreement on who markets seed," 09.24.1964, Folder 417, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹²² Ralph W. Cummings to Shri. C Subramaniam, "Multiplication and Distribution of Improved Seed Hybrids and Varieties of Farm Crops, Means of Accelerating," 09.25.1964, Folder 417, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹²³ Government of India, "Prospectus for Foreign Seed Corporation - Interested in Considering the Establishment of Business Operations in India"; Freeman, "American Seed Companies and Their Interest In India."

¹²⁴ R. W. Cummings to Robert D. Osler, "Explanation DeKalb," 07.02.1965, Folder 418, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

CHAPTER II

Rasmusen, DeKalb's head of Indian operations, died of a heart attack on October 1, 1964, causing DeKalb to question the entire operation.¹²⁵ The effects of Rasmusen's sudden death turned into a diplomatic incident between the United States and India that changed the Rockefeller Foundation's attitude and position in the establishment of the Indian seed industry. After a short visit from S. S. Chase, director of DeKalb's research department in April 1965, Chase called the US managing director of the Indian site, Pete Olson, back to the United States for consultations. After a year and a half, DeKalb's management was not satisfied with the state of operations, so Chase wrote a letter to the new minister of Food and Agriculture, C. Subramanian, directly—without consulting the Rockefeller Foundation—to voice his frustration. In this letter, Chase argued that the low retail price set by the National Seed Corporation for hybrid maize seeds made it impossible for the Agricultural Association to conduct profitable business. In a very harsh tone, he argued that sound enterprise would not work under present price and cost limitations:

As you know, we are oriented in our development work to what the market—our customers—want, or say they want. If the market wants this and if there is enough demand to warrant putting much time into research and production, then this is what we hope to produce for them. This is quite a different procedure than submitting certain numbers to some arbitrary group of government people who will decide whether this is what the market wants or not. Our attitude is that only 'the market' can decide what the market wants. It certainly cannot be decided by a small group of people what the market wants.¹²⁶

There is no direct reaction from the Indian government documented in the Rockefeller Archive files. Considering the uncommonly harsh language in a diplomatic context, this was to be expected. One month later, DeKalb officially announced its withdrawal from operations in India, arguing that the prospects of the hybrid seed industry were poor, and the problems in sales management were too large. DeKalb's decision came as a great surprise to other stakeholders, such as the US State Department. With the immediate loss of one third of the hybrid seed corn

¹²⁵ Traywick to Freeman, "Death of Rasmusen," 10.05.1964, Folder 417, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹²⁶ Sherret S. Chase to C. Subramanian, "Private pedigree seed," 05.01.1965, Folder 418, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

SOWING THE GREEN REVOLUTION IN INDIA (1957-1967)

production, the State Department anticipated disastrous effects on the Indian improved seed program and thereby Indian food production. Moreover, the US Embassy anticipated serious repercussions in its and the Rockefeller Foundation's mission to establish a "responsible" private seed industry, and were worried about the reputation of US corporations in India.¹²⁷

As an immediate reaction to the news that DeKalb was seriously considering liquidation of the Indian operation, the Rockefeller Foundation urged DeKalb's management under Tom Roberts' leadership to continue participating in the seed development program for the season. The US State Department started to hold teleconferences with DeKalb. DeKalb's executives explained that the corporation opposed the Government of India's price policy and feared it would eventually take over the seed business. Furthermore, Roberts stressed, DeKalb initiated the venture expecting Cooley loans that did not materialize. After talks with DeKalb, the US State Department and Rockefeller Foundation agreed that US businesses could not continue indefinitely without the expectation of profits, and that the State Department would intervene to discuss the matter of pricing with the Government of India. US AID had to jump in as a facilitator and was willing to guarantee assistance through Cooley loans. With the prospect of further loans, US AID could convince DeKalb to postpone the decision-making and fulfill contracts with the National Seed Corporation for 1965.¹²⁸

Likewise, the Rockefeller Foundation jumped in to convince DeKalb to continue business in India. Cummings could convince the government to increase purchase price of seed to 100 rupee, as the Indian government otherwise would have been forced to enter seed production

¹²⁷ US State Department to US AID, "Hybrid Seed Program," 06.10.1965, Folder 418, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹²⁸ Thomas M. Roberts to Ralph W. Cummings, "Withdrawal Decision," 06.08.1965, Folder 418, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; Sherret S. Chase to Ralph W. Cummings, "Withdrawal," 06.03.1965, Box 64, Folder 421, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

CHAPTER II

at this stage.¹²⁹ Thus, by becoming essential part of the Indian maize production, DeKalb earned room to maneuver and leverage to make demands for loans and better prices on the Indian seed market. US AID and the Rockefeller Foundation jumped in as facilitators to enforce their claims.¹³⁰

In the discussions on DeKalb's possible withdrawal, Rockefeller Foundation officials often regretted that Rasmusen was not alive. They agreed that this diplomatic incident would not have occurred under his leadership—he had a different attitude toward the operation in India, as he had been on the sites, gotten to know Indian maize farmers, and was personally closer to Rockefeller officials. He based his judgement on impressions and experiences he made while traveling in India, to rice fields and exchanges with government officials. Other DeKalb staff could only judge the enterprise by numbers that were not very promising. Rasmusen's reasoning as to why to invest and why to ignore certain risks in the expansion to India relied upon an alternative projection of the future of the Indian seed market. He assumed the role of a pioneer—a pioneer with a different vision of the long-term future profitability of business. For other DeKalb executives, making immediate profits needed to be the basis for expanding their business to India. “[H]umanitarian motives”¹³¹ were only a point of reference to secure US AID's and the Rockefeller Foundation's support. This resulted in a stereotypical situation in which DeKalb demanded to nationalize risks and to privatize profits. In sum, DeKalb's conduct and subsequent demands rendered absurd the Rockefeller Foundation's expectations of their reliability and integrity in the effort to increase India's agricultural productivity.

¹²⁹ United States Agency for International Development to State Department, “DeKalb's operation,” 06.18.1965, Folder 418, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹³⁰ Ralph W. Cummings to A. A. Johnson, “Discussion of DeKalb's behavior in India,” 06.30.1965, Folder 418, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹³¹ Thomas M. Roberts to Jack Adelman, “Application Grant,” 07.03.1965, Folder 418, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

SOWING THE GREEN REVOLUTION IN INDIA (1957-1967)

After DeKalb voiced concerns that hybrid varieties might not be suitable to the Indian agricultural economy, Cummings no longer found DeKalb a suitable partner for operations, but the Rockefeller Foundation continued to support DeKalb nonetheless. Rockefeller Foundation officials were very irritated because DeKalb did not inform them in advance of a possible withdrawal, as agreed in earlier discussions.¹³² Yet, for the Rockefeller officials, it was clear that multinational corporations had important knowledge and technology as well as research capacities and experiences to contribute to India's agricultural development, so that the officials continued to support the maize hybrid industry after the incident. Cooperation with the seed industry turned into an increasingly complex endeavor, in which the Rockefeller Foundation had to maintain and manage an ever-growing network of business contacts. It was in the interest of many US seed corporations to introduce their own pedigree hybrids to India, and more and more Indian entrepreneurs approached the Rockefeller Foundation to establish contacts with US American businesses.¹³³

Meanwhile, the expectations of the corporations towards the Rockefeller Foundation continued to grow. US corporations such as DeKalb continuously sent their maize varieties for preliminary testing through the Rockefeller Foundation to India. The Rockefeller Foundation sent maize hybrids to US corporations such as Cargill, Inc. to support their breeding efforts in order to make Cargill's varieties better suited for Indian conditions.¹³⁴ Thus, the Rockefeller officials trusted in the benefits of the free exchange of germplasm.¹³⁵ US seed companies not only wanted to profit from the privileged diplomatic position in domains of seed research and testing of the

¹³² Wayne H. Freeman to C. G. Olson, "DeKalb Agricultural Association," 06.11.1965, Folder 418, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹³³ D. C. Kothari to Ralph W. Cummings, "Correspondence with Kotari," 12.08.1965, Folder 420, Box 64, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹³⁴ Guy B. Baird to V. N. Kohli, "Cargill Inc. and Birla Brothers," 04.15.1966, Folder 421, Box 64, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹³⁵ Leland R. House to M. S. Swaminathan, "Seed Policy," 05.30.1966, Folder 432, Box 65, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

CHAPTER II

Rockefeller Foundation, but also wanted to advance their interests in seed legislation. The corporations feared that in the context of the Seed Law, the listing of varieties eligible for sale could prevent the licensing of privately produced hybrids and varieties, and demanded the Rockefeller Foundation to lobby against it.¹³⁶

DeKalb's sudden threat to withdraw not only shook the trust between DeKalb and the Rockefeller Foundation, but also revealed subliminal conflicts within the Rockefeller Foundation in balancing support between self-pollinating and hybrid crops. In the eyes of Guy E. Baird, one of Rockefeller's field directors, with its seemingly irrevocable decision DeKalb had put itself in a bad light, decreasing the chances of securing further foreign cooperation for seed production in India.¹³⁷ Cummings was especially upset about the take-home message Tom Roberts, head of DeKalb, had left: "[S]ome of the important technological advances (such as hybrid corn) of more advanced agricultural economies are not necessarily adapted to the economics of developing nations."¹³⁸ Roberts argued that he might reconsider investing in privately produced hybrid corn in India at a later point in time. Pete Olson, the former managing director of the Agricultural Association, argued accordingly that Indian research should turn toward self-pollinating seed—a seed the farmer can produce himself—at low cost. It was his conviction that hybrid seeds were not for India and that this was the major reasons for DeKalb's threat to withdraw from the Indian hybrid seed adventure.¹³⁹

¹³⁶ Wayne H. Freeman to Ralph W. Cummings, "Time Magazine Article," 06.08.1966, Folder 421, Box 64, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.; Allenby L. White to Ralph W. Cummings, "Northup in India," 08.24.1966, Folder 421, Box 64, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹³⁷ Guy B. Baird to A. H. Moseman, "Rockefeller's disappointment about DeKalb's withdrawal," 06.15.1965, Folder 418, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹³⁸ T. H. Roberts to A. A. Johnson, "Reasoning behind liquidation," 06.11.1965, Folder 418, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹³⁹ C. G. Olson to Wayne H. Freeman, "DeKalb's decision calculus," 06.12.1965, Folder 418, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

Cummings left India in November 1966; with his departure, the Rockefeller Foundation lost an active promoter of private seed business in India.¹⁴⁰ With the experiences Cummings had made with DeKalb in India, his attitude toward multinational corporations changed. He reassessed the importance of the seed industry in 1966, when he advised J. George Harrer, the Rockefeller Foundation's director, in the possibility of a collaboration with the World Bank and the Food and Agriculture Organization (FAO) in a seed production program. The World Bank showed interest in backing credits granted to seed companies through the National Seed Corporation, and the FAO proposed sending a delegation to look into the matter of seed improvement and multiplication. Contradicting his earlier convictions, Cummings did not want the Rockefeller Foundation to get involved in the debates of the FAO and the World Bank, as they, in his opinion, were too much in favor of private enterprises. At this point, he considered public research and multiplication to be at least as effective as privatized efforts.¹⁴¹

IMPLICATIONS FOR UNDERSTANDING THE GREEN REVOLUTION

At the height of discussions about DeKalb's retreat, in June 1964, the Rockefeller Foundation shipped a large delivery of Mexican Sonora 64 wheat varieties to India.¹⁴² While it channeled most resources into maize in the early 1960s, by the mid-1960s, the tide had turned towards self-pollinating rice and wheat varieties. Some Rockefeller officials, such as Ernest Sprague, shared doubts expressed by DeKalb's executives, that hybrids had a lower value than synthetics in so-called developing countries. Some Rockefeller Foundation officials argued that if they were to start over in Mexico, they would concentrate their efforts on synthetics, instead of focusing on the hybrids that they had helped develop and recommend for India.¹⁴³ Observing

¹⁴⁰ Rockefeller Foundation Staff Newsletter, "Cummings honored as He Leaves India," November 1966, Folder 143, Box 3, RG 20 Communications Office photographs, SG 1, Rockefeller Archive Center, Sleepy Hollow, NY.

¹⁴¹ Cummings, "Diary Notes."

¹⁴² Ralph W. Cummings to Moseman, "Sonora 64," 06.23.1965, Folder 536, Box 83, Subseries 6, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center.

¹⁴³ R. D. Osler to Ralph W. Cummings, "Assesment of seed business situation after DeKalb's Withdrawal," 07.08.1965, Folder 418, Box 63, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

CHAPTER II

only limited success of the hybrid varieties, the attention of the Rockefeller Foundation shifted to wheat from Mexico and to rice varieties from the International Rice Research Institute in the Philippines in 1965.¹⁴⁴

Rockefeller Foundation personnel who had earlier been involved in promoting a private maize market began to work for the wheat and rice improvement programs. Johnson E. Douglas started to work for the wheat seed improvement program in June 1966.¹⁴⁵ From 1967, Wayne Freeman worked for the All-India Coordinated Rice Improvement Program, initiated in April 1965.¹⁴⁶ As part of this project, the Government of India bought 18,000 tons of rice from the International Rice Research Institute, and planted it on experimental plots in Punjab. The Indian Agricultural Research Institute (IARI) coordinated these trials, which the Rockefeller Foundation had started to support in 1956.¹⁴⁷

The National Seed Corporation experienced similar institutional continuities. Initially, in 1960, the Indian cabinet decided that wheat and rice programs should be the responsibility of states and should not fall under the National Seed Corporation. In 1966, however, this approach changed to favor centralization. Rice and wheat seed multiplication became part of the responsibilities of the National Seed Corporation.¹⁴⁸

Maize had always been a crop of minor importance for India, which focused traditionally much more on producing wheat and rice. Why however did the Indian government decide after

¹⁴⁴ Ralph W. Cummings, "Mexican Seed for India," 04.04.1966, Folder 536, Box 83, Subseries 6, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹⁴⁵ Ralph W. Cummings, "Suggested Rockefeller Foundation Support to India's Good Quality Seed Production Program," 04.13.1966, Folder 253, Box 37, Series III Officers' Diaries, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY; Marci R. Baranski, "Wide adaptation of Green Revolution wheat: international roots and the Indian context of a new plant breeding ideal, 1960-1970," *Studies in history and philosophy of biological and biomedical sciences* 50 (2015): 43.

¹⁴⁶ James E. Douglas to James W. Wallace, "Information on seed law," 01.19.1967, Folder 422, Box 64, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹⁴⁷ Unger, *Entwicklungspfade in Indien*, 176.

¹⁴⁸ Cummings, "Diary Notes."

independence to promote research on hybrid maize? Goldsmith and Lele found two major reasons for this curious choice: first, the IARI believed that programs on other crops were already very successful and did not need any further assistance. Second, only few Indian researchers worked on maize; fewer Indian scientists might have felt threatened by foreign interventions in their field.¹⁴⁹

With the commercialization of maize, ideas and practices around marketing had changed. The Government of India participated in setting up marketing and seed testing facilities, and established a legal framework for the certification and labeling of seed as part of the All India Maize Improvement program. These structures formed the basis for the dissemination of Green Revolution wheat and rice varieties.¹⁵⁰ In 1968, a central seed committee formed to advise the Central Government on matters related to the implementation of the Seed Act—the varieties to be initially included for seed law enforcement, seed certification standards and procedures. The Rockefeller Foundation continued to be active in this field, and sponsored an educational tour for committee members to inform them about certification, seed law enforcement, seed testing, and seed production in the United States. In this way, the Rockefeller Foundation continued to promote a model of agriculture that its director, J. George Harrar, described as follows:

[Agriculture is] the one industry that is fundamentally important to the economic development of all nations.[...] [T]he farmer, in order that he may take full advantage of the land and help increase the supply of agricultural commodities, must be better prepared through improved educational opportunities; and through the provision of services such as up-to-date information, modern technology, improved varieties and essential agricultural chemicals and fertilizers, ready credit and access to markets. Standing behind the farmer is a whole array of related business and industry, which both contributes to the total process and profits from it.¹⁵¹

¹⁴⁹ Uma Lele and Arthur Goldsmith, “The Development of National Agricultural Research Capacity: India’s Experience with the Rockefeller Foundation and Its Significance for Africa,” *Economic Development and Cultural Change*, 37, no. 2, 314.

¹⁵⁰ India Crop Improvement and Certified Seed Producers Association, “Good Seed Does not Cost It Pays,” 1968, Folder 424, Box 64, Subseries 4, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, Sleepy Hollow, NY.

¹⁵¹ J. George Harrar, “Hearings on War on Hunger, House Committee on Agriculture,” 02.16.1966, Box 20, J. George Harrar Papers, Rockefeller Archive Center.

He presented a technology-driven, commercial approach to agricultural modernization. The establishment of a private seed market and trust in hybrid maize varieties was part of a shared conviction that science had the power to fight hunger. In their mission to establish a hybrid seed market in India, Cummings and other Rockefeller officials understood multinational corporations as the ideal agents of technological change. The scientific approach to development presented an alternative to the ideology-based solutions, supposedly propagated by the Soviet Union.¹⁵² Both the Rockefeller Foundation and the Government of India promoted the idea that the world could be united by technology and science.¹⁵³

While historical literature has often stressed how the promotion of science and technology negatively affected income inequalities in the context of the Green Revolution, focusing on the close ties of the corporate-philanthropic-government network, we can shed light on another dimension: how policy-makers developed a notion of agriculture as a ‘commercial enterprise’. Historian Madhumita Saha stresses: “[A]gricultural development did not care for ‘lost souls’ as it was seen as a commercial enterprise and not as a charity.”¹⁵⁴ Earlier approaches to rural development, such as the CDP, also relied upon scientific practices to improve the conditions of rural India, yet it chose less capital-intensive technologies that were locally available to strengthen agricultural production. Thus, it did not focus on foreign direct investment, but promoted a different vision of agriculture and the value of village communities.¹⁵⁵

CONCLUSION: A PHILANTHROPIC-GOVERNMENT-CORPORATE NETWORK

The idea of a commercially organized seed market outlived the failed efforts of the Rockefeller Foundation to establish hybrid maize varieties on a larger scale in India. For example, Norman Borlaug promoted private seed companies to take a leading role in the seed multiplication and production in India for spreading the high-yielding wheat varieties from Mexico. By contrary,

¹⁵² Unger, *Entwicklungspfade in Indien*, 76.

¹⁵³ Unger, *Entwicklungspfade in Indien*, 107.

¹⁵⁴ Madhumita Saha, “Food for Soil, Food for People: Research on Food Crops, Fertilizer, and the Making of Modern Indian Agriculture,” *Technology and Culture* 54, no. 2 (2013): 209.

¹⁵⁵ Saha, “Food for Soil, Food for People,” 212.

the Minister for Food and Agriculture, Chidambaram Subramaniam, suggested multiplying seed through the state-owned National Seed Corporation.¹⁵⁶ Borlaug was disappointed with India's Seed Multiplication Programs and soon demanded that the Seed Producers Association and by private seed companies carried out further programs to stimulate the Indian seed production.¹⁵⁷

The Green Revolution approach to rural development was a technological response to the problems of rural poverty and insufficient food production in India. To encourage the spread of technologies, the Rockefeller Foundation and the US government preferred market-oriented structures in which private companies could play a central role. In the late 1950s, the case of the establishment of the maize seed business in India showed that they perceived companies to be indispensable partners in rural development. Therefore, they promoted a legal framework and market institutions as a basis for this private-enterprise-oriented system of agriculture. Hence, development actors such as the Rockefeller Foundation and US AID spread liberal ideas and market institutions in the context of the Green Revolution, providing the basis for the establishment of a strong private agribusiness sector in India.

In more general terms, the introduction of hybrids to the Indian seed market can be interpreted as a process of commodification, (i.e. a process of turning a public good into a marketable good), requiring the legal framework to be adapted accordingly. US experiences informed but did not determine this framework. The first regulations with respect to seed dissemination were introduced in the early twentieth century. Until then, most people had considered seed to be a public good and a shared resource among farmers. With the introduction of hybrid seeds and legal changes protecting germplasm, the possibility of commodifying and monopolizing seed ownership arose. Seed laws requiring mandatory certification and compliance with quality

¹⁵⁶ Norman E. Borlaug, "Organizing National Crop Production Campaigns," 04.02.1968, Folder 52, Box 4, Series 2, Rockefeller Records, Pamphlet Files, Rockefeller Archive Center, Sleepy Hollow, New York (NY).

¹⁵⁷ Norman E. Borlaug, "Sonora 64 wheat seed multiplication," 08.20.1965, Folder 536, Box 83, Subseries 6, Series IV, Subgroup I, RG 6.7 New Delhi Field Office, Rockefeller Archive Center, NY.

CHAPTER II

standards allowed dispossessing farmers of control over their seeds.¹⁵⁸ Hence, the changes to India's seed law profoundly affected people's seed sovereignty— defined as “people's right to save, replant breed and share seeds, and their right to participate in the decision-making processes regarding rules and laws that regulate their access and use.”¹⁵⁹ However, the Government of India questioned the Rockefeller Foundation's seed law recommendations; the Seed Law was not the mere result of a foreign intervention. Rather, the Indian government adapted the law to its demands, controlling what kind of seed were planted in the Indian agriculture. Consequently, firms feared that the strong role of the Indian state might interfere with their business interests.

Understanding the Rockefeller Foundation as ‘philanthropic’ actor in the establishment of a private seed market in India might be misleading. Derived from the ancient-Greek words for “friend” (*φίλος* *philos*) and “human” (*ανθρωπος* *ánthrōpos*), the word philanthropic describes a humanitarian behavior and a mindset that prioritizes human well-being over profit-oriented goals. Considering the preoccupation of some Rockefeller Foundation officials with the liberalization of the Indian seed market and the promotion of US businesses, it might also be suitable to describe the Rockefeller Foundation as ‘philagoric’, as a friend of markets (*ἀγορά* *agora*). Cooperation with the US seed business DeKalb highlights how US development policies, in general, and those of the Rockefeller Foundation, in particular, were strongly intertwined with foreign economic interests.

The Rockefeller Foundation regarded seed companies as experts and their research capacities as important resources. Ideas of the superiority of a liberal, profit-oriented organization of the seed market formed the basis of the Green Revolution approach to rural development, using technology to overcome the perceived backwardness of rural areas. The corporations drew mostly on their historical experiences in the US grain belts and Northern Europe to understand, analyze, and solve the problems of tropical agriculture. By advocating expensive practices and

¹⁵⁸ Tamara Wattnem, “Seed laws, certification and standardization: outlawing informal seed systems in the Global South,” *The Journal of Peasant Studies* 43, no. 4 (2016): 2.

¹⁵⁹ Wattnem, “Seed laws, certification and standardization,” 1.

technological inputs, the Rockefeller Foundation implicitly assumed that Indian farmers could access financial and infrastructural resources similar to those of farmers in the United States and therefore had to target the most affluent Indian farmers in its approach.

By examining the Indian maize seed market, I show that ideas and institutions of rural development have a longer legacy and impact. Historical research often interpreted the Green Revolution as the first “scientific” approach to rural development, although earlier rural development strategies had similarly relied on scientific research.¹⁶⁰ In providing a network of seed multiplication farms and an extension network, Community Development formed a basis for the take-off of the Green Revolution, of which however the more affluent peasants profited the most. Making a too strong differentiation between the CDP and the Green Revolution might conceal institutional and technological continuities of the two approaches. In order to clearly distinguish these two approaches, it might therefore be useful to stress the commercial elements in the Green Revolution.¹⁶¹

This case study of the establishment of the seed market in India shows that the relationship between the Rockefeller Foundation and US corporations was more than just a strategic alliance for a specific project. The cooperation rooted in a development doctrine that understood multinational corporations as indispensable experts and partners in rural development processes. For the corporations, it was an opportunity for international proliferation and for the expansion of potentially profitable markets. While participating actors verbally stressed humanitarian motives, they always competed with the motive to make profits. Multinational companies carried out important management functions in building up new market structures, and had to rely on their expertise in producing and marketing new technologies.

DeKalb’s behavior in India demonstrated that the expansion of markets to the so-called developing world was not a priority. DeKalb hesitated to expand. In its expansions, the corporation collaborated with the Rockefeller Foundation as facilitator and with its home

¹⁶⁰ Saha, “Food for Soil, Food for People,” 201.

¹⁶¹ Harwood, “Was the Green Revolution intended to maximise food production?.”

CHAPTER II

governments as financier, providing guarantees and funding for their market expansion. Despite the US government and the Rockefeller Foundation's stress on liberal ideas of free markets, US corporate expansion relied heavily upon state interventions. DeKalb could only be convinced to continue operating in India when state institutions carried their risks.

CHAPTER III

FERTILIZING THE GREEN REVOLUTION IN INDIA (1955-70)

After World War II (and with particular intensity in the 1960s), international development actors such as the FAO hailed fertilizers both as a means to introduce modernity to rural areas and as something of a panacea in the ‘fight against hunger.’ Among members of the international development community, the fertilizer industry, and rural planners, fertilizers were central to strategies of agricultural modernization and intensification. Therefore, fertilizer producers came to play an increasingly important role in the design of rural development programs.¹⁶² As most of the promoted fertilizers were manufactured in factories, rural and industrial development became increasingly intertwined.

While the Green Revolution’s ‘miracle seeds’ received much applause and attention in historical research, this research ignores that chemical fertilizers received more attention from the international development community at the time. Many policy-makers thought of it in terms of a simple equation: the more fertilizers available, the faster agricultural production could grow. I give an example in illustration 3 of the typical visualization of the Green Revolution as a steep upward curve (in this case, of food grain production in India). The figure visualizes the food grain production in India between the 1962/1963 season and the 1977/1978 season. The production of wheat in India increased from 12.3 million tons to 31.7 million tons. This marked an increase of about 158 per cent. Similarly, the production of rice grew from 39.3 million tons to 52.7 million tons—a 34 per cent increase. The first part of the graph shows yield increases in relation to fertilizer consumption, the second part in relation to gross cropped area. On the one hand, it illustrates that crop production grew because fertilizer consumption multiplied manifold. On the other hand, it shows that food production grew because India cultivated more land for grain production.

¹⁶² P.K. Narayanaswamy and K. Pushparaj, “Impact of the fertiliser industry on rural development,” in *Development of Fertilisers in India*, ed. T. M. Alexander (New Dehli: The Fertilizer Association of India, 1980), 205–9.

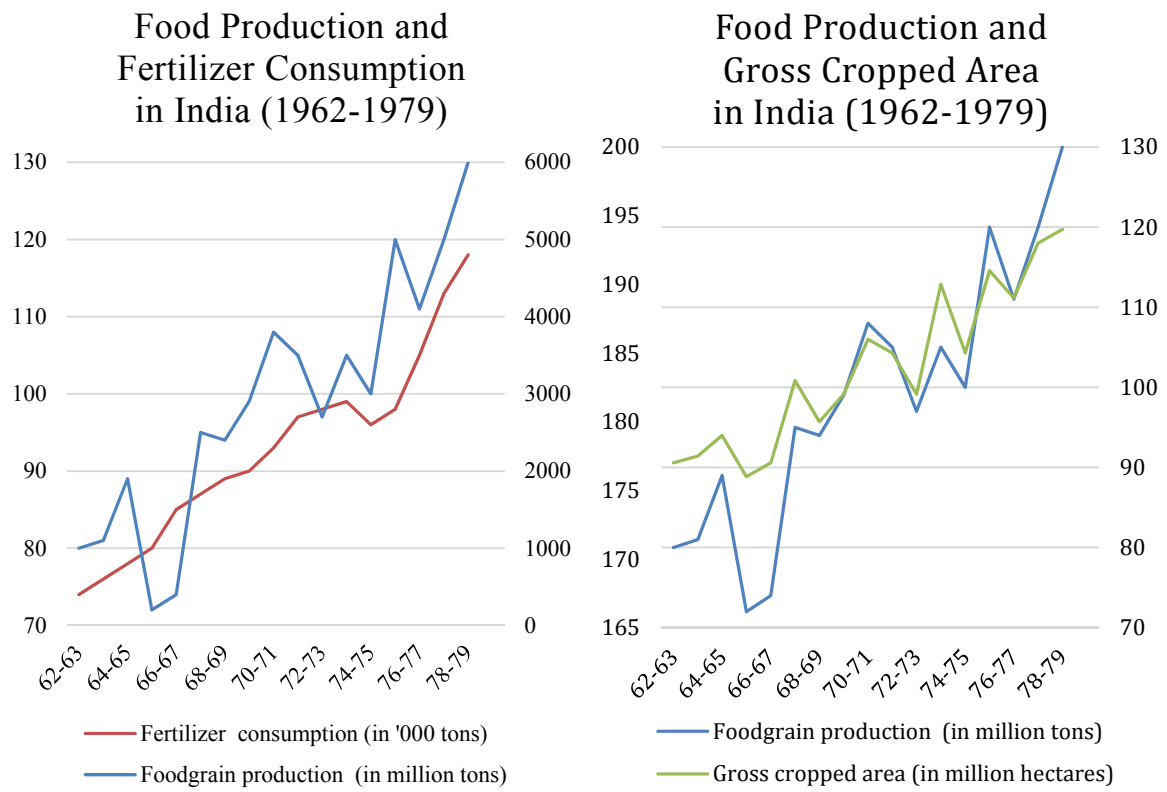


Figure 3 Food grain production and Fertilizer consumption in India (1962-1979), Food grain production and gross cropped area (1962-1979).¹⁶³

After the Second World War, between 1946 and 1977, global consumption of chemical fertilizers increased more than twelve-fold, from 7.5 million tons in 1946 to 94.6 million tons in 1977. However, North America, Europe, and the Soviet Union still accounted for 71 per cent of global consumption even at the end of a phase of rapidly increasing consumption of chemical fertilizers in so-called developing countries.¹⁶⁴

¹⁶³ Data extracted from a graph published by the Fertilizer Association of India. Alexander, *Development of Fertilisers in India*, 42.

¹⁶⁴ Easo John, "Growth in Fertiliser Consumption in India," in *Development of Fertilisers in India*, ed. T. M. Alexander (New Dehli: The Fertilizer Association of India, 1980): 151.

Historian Corinna R. Unger stresses the decidedly political character of the apparently technical concern to increase the production and distribution of fertilizers within the Food and Agriculture Organisation (FAO). Analyzing different initiatives within the FAO, she observes that the initiatives did not only regard fertilizer as the key to economic growth and social modernization, but as a way to create political stability through their dissemination. Stressing the importance of fertilizers in agricultural development, the FAO played a special role in promoting their use in developing countries. From 1959 onwards, the organization sent a Fertilizer Survey Team to Asia and the Middle East to collect data on fertilizer demand and supply in developing countries. At the same time, meetings between FAO employees and representatives of the international fertilizer industry were established.¹⁶⁵ Until today, the FAO has provided the largest database available for the global consumption of fertilizers. Because of these efforts, FAO's data on the global fertilizer consumption and production made the market potentials of the so-called developing world legible for governments and the fertilizer industry alike.

The fertilizer industry was not only trading fertilizers internationally but also engineering expertise. Engineering corporations—subsidiaries of large chemical corporations—sold process technology and engineering capabilities needed for the expansion of production capacity in the Global South. This technological expertise was available from only a few corporations in the Global North.¹⁶⁶ For example, Hoechst had a subsidiary, Uhde Ingenieurbüro, with major interest in fertilizer plant design and engineering.¹⁶⁷ These engineering corporations often turned

¹⁶⁵ Unger, *Entwicklungspfade in Indien*, 93–6.

¹⁶⁶ Other than today's fertilizer corporations, fertilizer corporations in the 1950s, 1960s, and 1970s tended to be widely diversified companies and the US corporations such as Exxon, Williams Company, or International Minerals and Chemicals were founded on energy related businesses such as oil and gas exploitation. On a global scale, the largest corporations were, for example, BASF (West Germany), Imperial Chemical Industries (Great Britain), DSM (Netherlands), Exxon Chemicals, or W.R. Grace (United States of America). United Nations Centre on Transnational Corporations, *Transnational Corporations in the Fertiliser Industry* (New York: United Nations Organisation, 1982): 3, 37, 39.

¹⁶⁷ DSM (Netherlands) had a similar structure with Stamicarbon as well as Montedison (Italy) with Technimont, and Imperial Chemical Industries.

CHAPTER III

into turnkey contractors, operating on an international scale. However, these companies were less engaged in the management of fertilizer production and its marketing.¹⁶⁸

In the beginning of the 1960s, only a few corporations were undertaking fertilizer production overseas in their own factories. For them, risks of expropriation of their large-scale investments into the construction of factories were too high. Instead, large fertilizer manufacturers were providing the knowledge as opposed to financial means to expand production capacities. Due to the lack of technological expertise, developing economies such as India were dependent on the above-mentioned companies until the late 1960s in their expansion of production facilities, which, especially in India, were mostly in the hands of public corporations. To cover the capital needs of these large-scale production projects, tied development aid reached up to range 30 to 40 per cent of total project costs in construction projects.¹⁶⁹ Hence, the provision of financial resources tied the expansion of the fertilizer industry to development aid.

This chapter analyses the role of the private industry in the expansion of India's fertilizer production from 1955 to 1970. In this process, to avoid high foreign currency expenses through imports, India invested massively in the expansion of its fertilizer industry and presented a remarkable growth in its fertilizer capacities between 1955 and 1980.¹⁷⁰ In the first section of this chapter, I highlight both Indian domestic debates on the role of the private sector in fertilizer production, and the international influence on policy changes in the 1960s in the context of the Green Revolution. I describe the expansion of Indian industry in the 1950s through the lens of the West German engineering company, Uhde, which constructed a fertilizer plant as part of the steel works in Rourkela. In a third section, I examine the negotiations with the Indian fertilizer consortium of US corporations under the leadership of the US American engineering and

¹⁶⁸ United Nations Centre on Transnational Corporations, *Transnational Corporations in the Fertiliser Industry*, 31–40.

¹⁶⁹ By 1980, India turned into the fourth largest fertilizer producer and consumer in the world, following the USA, USSR, and China. United Nations Centre on Transnational Corporations, *Transnational Corporations in the Fertiliser Industry*, 58–67.

¹⁷⁰ S. K. Mukherjee, "Technological Developments in India's Fertiliser Industry," in *Development of Fertilisers in India*, ed. T. M. Alexander, (New Dehli: The Fertilizer Association of India, 1980): 89–90.

construction company, Bechtel, in the early 1960s, and the US influence on the decision-making processes of the Indian government to open for private foreign investments after 1966. Finally, I show how the Indian fertilizer industry profited from technological spillover effects and how the Indian fertilizer company Fertilisers and Chemicals, Travancore (FACT) established itself as a player in rural development.

THE DEVELOPMENT OF THE FERTILIZER INDUSTRY IN INDIA IN THE EARLY TWENTIETH CENTURY

The impact of fertilizers on Indian agricultural productivity was the question of a long domestic debate, weighing up the usage of organic manures, as practiced in China, versus the use of capital-intensive chemical fertilizers.¹⁷¹ For example, in 1928, the Royal Commission on Fertilizers found that India had too small rainfall for an agricultural development strategy, relying on chemical fertilizers on a large scale. A report stressed:

It is hardly necessary to point out that the use of nitrogenous or other artificial fertilisers is not profitable in all conditions. Where crop production is limited by a small rainfall, the annual additions of combined nitrogen to the soil as the result of natural processes may be sufficient to meet the needs of a crop the out-turn of which is limited by the moisture available.¹⁷²

The Royal Commission on Agriculture based their fertilizer strategy on organic manures and composts in the 1930s and 1940s.¹⁷³ In the 1950s, India expanded irrigation to new parts of the country by investing heavily in irrigation systems in a few states. Both the Grow More Food campaign initiated in 1948 and the Community Development Programme (CDP) of the 1950s encouraged the use of fertilizers in general, but did not specifically encourage chemical fertilizers.¹⁷⁴ Both initiatives laid stress on the use of compost and green manures for soil

¹⁷¹ See for example: Schmalzer, *Red Revolution, Green Revolution*.

¹⁷² Royal Commission as quoted in S.S. Bajjal, "Fertiliser Policies and their impact of fertiliser production and consumption," *Development of Fertilisers in India*, ed. T. M. Alexander, (New Dehli: The Fertilizer Association of India, 1980): 260.

¹⁷³ B. Sivaraman, "Fertilisers in Indian Agriculture," *Development of Fertilisers in India*, ed. T. M. Alexander (New Dehli: The Fertilizer Association of India, 1980): 31–62.

¹⁷⁴ Saha, "Food for Soil, Food for People."

CHAPTER III

conditioning to obtain self-sufficiency in food production.¹⁷⁵ With the CDP, the government extension service changed remarkably by providing demonstration programs on cultivators' fields. Many of the liberalized policies of the 1960s, in which this form of fertilizer promotion received special attention, found their institutional base in this approach. S. S. Bajjal, a Managing Director of the Indian fertilizer manufacturer Indian Explosives Ltd., remembered that the "success of schemes depended upon the degree of coordination [between] government and industry."¹⁷⁶

India's fertilizer industry grew slowly before 1960.¹⁷⁷ In 1944, the central government established a Fertilizer Pool to regulate and fully control fertilizer distribution and prices.¹⁷⁸ However, with the Industrial Policy Resolution in 1948, the impact of the private industry had the potential to grow, as the Indian government allowed for private participation in the manufacturing of fertilizers.¹⁷⁹ Although private investments would have been possible, the large capital outlays necessary for the construction of fertilizer manufacturing facilities and the monopolized distribution system made fertilizer production in India remain a public affair. Capital investments by foreign corporations were limited, so that foreign direct investments did not have a significant impact on the growth of the industry in the 1940s and 1950s. Yet, multinational corporations played an important part in providing technology and expertise for the construction of plants, as discussed in further detail in the next section.¹⁸⁰ Yet, in the 1950s

¹⁷⁵ Sivaraman, "Fertilisers in Indian Agriculture," 31–62.

¹⁷⁶ Bajjal, "Fertiliser Policies and their impact of fertiliser production and consumption," 273.

¹⁷⁷ Mukherjee, "Technological Developments in India's Fertiliser Industry," 89–90.

¹⁷⁸ Bajjal, "Fertiliser Policies and their impact of fertiliser production and consumption," 206–61.

¹⁷⁹ Based on the resolution, the Indian industry was organized in three parts: a) basic fields reserved for the public sector such as steel, b) fields to be regulated and controlled by government but in which the private sector could also participate, and c) residual areas left to the private sector. The fertilizer industry was in the second category. Bajjal, "Fertiliser Policies and their impact of fertiliser production and consumption," 263–66; Corinna R. Unger, "Export und Entwicklung: Westliche Wirtschaftsinteressen in Indien im Kontext der Dekolonisation und des Kalten Krieges," *Jahrbuch für Wirtschaftsgeschichte* 1 (2012): 71.

¹⁸⁰ United Nations Centre on Transnational Corporations, *Transnational Corporations in the Fertiliser Industry*, 58–67.

and 1960s, the government monopolized channels of fertilizer distribution. Agricultural cooperatives served as the “vehicles” of this system.¹⁸¹ Private industry remained of secondary importance in the production and marketing of fertilizers.

From the first five-year plan (1951-56) to the second five-year plan (1956-61), the Indian government shifted its objectives from an emphasis on agriculture (31 per cent of funds) to an emphasis on industrial development. From first to second plan, it reduced its spending for agriculture to a mere 20 per cent. The focus of the second plan was on large-scale industrial projects such as Rourkela, the construction of a steel works supported by the West German government. In 1956, the West German companies Krupp, Demag, and Gutehoffnungshütte signed the contract with the Indian government for the construction of a smelting works, with a capacity of a million tons of steel per year.

For West German policy-makers, the steel works project of Rourkela was not only important as a large-scale industrialization project (involving 36 West German corporations) but also as a showcase of West German technical expertise presented as development aid.¹⁸² The by-products of the steel production were used for the production of an agricultural input: fertilizer. Coke oven gases were converted into ammonia and calcium ammonium nitrate. This ammonia plant was a turnkey job given to the West German engineering company Uhde (today, ThyssenKrupp Industrial Solutions).¹⁸³ The relationship between the steel works in Rourkela and its fertilizer manufacturing capacity was analogous to the significance the Indian government ascribed to the production of chemical fertilizers, ranking second behind the symbolically loaded production of steel, but being part of the agenda nonetheless.¹⁸⁴

¹⁸¹ Wayne Broehl, *The Village Entrepreneur: Change Agents in India's Rural Development*, (Cambridge, Mass., London: Harvard University Press, 1978): 34.

¹⁸² Dr. Johann David Gerstein, “Chronik,” ThyssenKrupp Archives, Duisburg: TKU/1; Unger, *Entwicklungspfade in Indien*, 186.

¹⁸³ Paul Pothen, “Toward Technological Self-Reliance,” in *Development of Fertilisers in India*, ed. T. M. Alexander (New Dehli: The Fertilizer Association of India, 1980): 119.

¹⁸⁴ S.S. Bajjal, “Fertiliser Policies and their impact of fertilizer production and consumption,” 206–61.

**UHDE'S FERTILIZER FACTORY AS PART OF THE ROURKELA STEEL WORKS,
(1955–63)**

In the following, I present the case of the Rourkela fertilizer plant (constructed from 1959 to 1963) as an example of the expansion of the Indian fertilizer industry in the 1950s.

When Uhde won the tendering for the planning of a nitrogen plant using the coke oven gases of the steelworks of Rourkela in 1959, the company already had had more than 30 years of experience in the field.¹⁸⁵ Yet, the order of Hindustan Steel Ltd., an Indian state-owned corporation, to build the “largest fertilizer plant of Asia,” was also the largest order the company had ever received.¹⁸⁶ Planning to use 70,000 cubic meters of coke oven gases, Uhde built four units, each producing 210 tons of nitric acids per day. The maximum production capacity was more than 4 times the average size of the plants that Uhde had planned before. Only the plant for the Aswan dam in Egypt had been similar in size (with three units producing 205 tons each per day). Uhde earned 67 million Deutsche Mark and 16.5 million rupees with the plant construction works in Rourkela. Although Uhde had a diverse international portfolio of plants in Europe and the United States, the Aswan dam and the fertilizer plant in Rourkela were its largest and most important orders. The collaboration with governments of so-called developing countries was a lucrative business.¹⁸⁷

Uhde had a long history of planning fertilizer plants. Friedrich Uhde, a chemist, founded the plant engineering company in 1921, producing printing ink to earn capital for larger investments. Before the founding of his company, Friedrich Uhde gained experience in the production of nitric acids based on the Ostwald process in Lothringia.¹⁸⁸ The West German

¹⁸⁵ Uhde Ingenieurbüro, “Zusammenstellung aller gebauten Anlagen von 1925-1958,” TKU/60, ThyssenKrupp Archives, Duisburg.

¹⁸⁶ The Hindu, “A new chemical plant,” 03.07.1960, TKU/78, ThyssenKrupp Archives, Duisburg.

¹⁸⁷ Uhde, “Chronik von Dr. Johann David Gerstein,” ThyssenKrupp Archives, Duisburg, TKU/1; ThyssenKrupp AG, “Düngemittelfabriken. Referenzliste,” 1974, Fsch/1, ThyssenKrupp Archives, Duisburg.

¹⁸⁸ The production of nitric acids was financially very lucrative as nitric acids were used for the production of explosives for military purposes until 1918, and for fertilizers in peacetime production. In Chronik von Dr. Johann David Gerstein. TKU/1, ThyssenKrupp Archives, Duisburg.

chemical company BASF held the patents for the synthesis of ammonia, based on the Haber-Bosch process. Using these patents would have been expensive for Friedrich Uhde. Therefore, he developed his own procedure between 1925 and 1928. This procedure used coke oven gases to produce nitrogen fertilizers.¹⁸⁹

Slowly recovering from the economic difficulties in and after the Second World War, Uhde would have liked to get involved in many more fertilizer plant projects in India. Due to market saturation, it was difficult for Uhde to sell further plants in Europe. The company's revenues reflected this reality. However, in the context of India's fertilizer industry expansion, Uhde saw an opportunity to expand business abroad, and participated in a tender for a fertilizer plant in Bhakra-Nangal. Despite engaging in extensive negotiations, the company lost that tender in the last round to a French corporation, due to a twenty per cent depreciation of the French franc. The impact of monetary and macroeconomic policies left an impression on how the company conducted business in the future. Uhde was therefore very concerned about macroeconomic factors, such as exchange rates and the export funding policies of the West German government, which had a strong influence on its success in foreign markets.

In 1960, after the successful Rourkela tender, revenue from abroad was already four times higher than domestic revenue. Uhde was not the only engineering corporation to internationalize its activities. Johann David Gerstein, Uhde's executive, observed that the competition among engineering corporations increased over the course of the first half of the twentieth century. As the United States and the Soviet Union fought their battle over the superiority of their economic systems with increasing intensity in so-called developing countries, Gerstein noted difficulties in keeping up with the competition from the Soviet Union, and argued:

The Russians are in the forehand because they can disregard commercial considerations and necessities in their contracts when it comes to winning a project for themselves. Their aim is not to do profitable business, but to penetrate the markets of underdeveloped countries. They are also in a more favorable position than we are because they take over more of the export goods from the underdeveloped countries, even if they cannot use them in their own country. They sell them [...] as far as they

¹⁸⁹ Entwicklungen beim Bau von Düngemittelanlagen, Bericht von Dr. Wengeler (1961), TKU/66, ThyssenKrupp Archives, Duisburg.

CHAPTER III

cannot use them themselves, if necessary with a loss to third countries at lower prices, a procedure that is not possible within the framework of our economic system.¹⁹⁰

Gerstein felt like an outsider in the development battle in the bipolar world order, and feared losing business opportunities his company had worked for in the aftermath of the Second World War. Although he sensed that his business contacts wanted to abstain from aligning to the superpowers and therefore preferred to collaborate with West Germans (or other smaller powers), he complained about a lack of support from the West German government in terms of granting credits and giving guarantees in case of possible losses.¹⁹¹

With the funding of steelworks, German development aid stepped into a gap the United States had left. The United States refused to support steel works in India, as they were state-owned companies, although “observers from all sides saw the steel contest as a battle for the Indian future, a front in the economic cold war.”¹⁹² In the steel contest, “each donor sought to prove its superiority and win the Indians over to its side.”¹⁹³ Historian David C. Engerman stresses that in these contests, development assistance altered domestic politics in recipient nations by providing certain groups with resources “to advance their own economic visions and interests.”¹⁹⁴ Engerman nonetheless interprets the “economic cold war” mostly as a bipolar struggle between the two superpowers, and excludes other donors from his analysis. However, for the fertilizer sector in particular, a multipolar analytical frame is more suitable.

In the Rourkela tender for a fertilizer plant, Uhde saw itself confronted with strong competition from French corporations, which, again, profited from an Indian-French treaty for the funding of large-scale investment projects. In addition to West German and French corporations, Dutch,

¹⁹⁰ J.D. Gerstein, “Anlagegeschäft Hoechst-Uhde International GmbH,” 05.30.1960, TKU/86, ThyssenKrupp Archives, Duisburg, 1, (translation by the author).

¹⁹¹ J. D. Gerstein, “Anlagegeschäft Hoechst-Uhde International GmbH,” n.d., 3, (translation by the author).

¹⁹² David C. Engerman, *The Price of Aid: The Economic Cold War in India* (Cambridge, Mass.: Harvard University Press, 2018): 132.

¹⁹³ Ibid.

¹⁹⁴ Engerman, *The Price of Aid*, 9.

Italian, and US American corporations were interested in the tender. The competition between states to support their businesses placed Indian decision-makers in a comfortable position, from which they could make bold demands in negotiation processes. Whilst they compared the tenders of different corporations in terms of costs and technologies used, they also considered financial support through development aid funds. Thus, engineering corporations not only had to compete in terms of technical skills and prices for plant construction, but also in terms of the development aid, they could bring.

This incentivized corporate leaders to lobby for business-friendly development aid policies in order to win tenders abroad. Confronted with many competitors, Uhde pushed the Ministry for Economic affairs to support its endeavor. For the West German government, the idea that a Dutch fertilizer plant would accompany the West German steel works in Rourkela was incompatible with the notion of West German prestige. Therefore, unlike in the tendering for Bhakra-Nangal, the West German government got involved and exerted financial pressure on the Indian government to award a contract to a West German corporation for the construction of the Rourkela fertilizer plant. It also offered incentives such as export guarantees, although the Indian funding situation did not comply with the applicable guidelines.¹⁹⁵ This funding for the fertilizer plant could only be made available in the context of the larger project to create a “Ruhr area in India,” the steelworks project in Rourkela.¹⁹⁶

With West German development funds and with a guarantee by Hoechst AG, the contract for the construction of the by-products fertilizer factory of Rourkela was signed in 1959.¹⁹⁷ Thus, with the construction of the fertilizer factory in Rourkela, Uhde experienced for the first time extensive state support through development aid funds. Based on the negative experience of losing a tender in the last minute as well as the positive experience of receiving extensive support in the Rourkela project, Uhde asked with increasing confidence for better financial support by

¹⁹⁵ Wirtschaftsbericht, “Brief an die Landeszentralbank,” ThyssenKrupp Archives, Duisburg: TKU/101.

¹⁹⁶ Bunte Deutsche Illustrierte, “Gewinnt Deutschland in Indien die Stahlschlacht gegen Russland?,” 26, 06.27.1959, ThyssenKrupps Archive, Duisburg.

¹⁹⁷ Unger, *Entwicklungspfade in Indien*, 186.

CHAPTER III

the West German government.¹⁹⁸ Uhde joined the loud calls for more tied aid in the 1960s, which came from a strong lobby of West German corporations demanding export support and subsidies.¹⁹⁹

Lobbyists for tied aid in West Germany claimed that as development aid and long-term export financing came from the same source, taxpayers' money, it should also serve West German interests. Lobbyists presented themselves confidently as the purveyors of superior West German technologies. The bank manager and lobbyist Leonard Stitz-Ulrici summarized the attitude as follows:

If we do not tie up our resources, as everyone else does, we wash the dishes of other people with our champagne [...] Development aid and long-term export finance come from the same state source. This is taxpayers' money [...] Developing countries would not get the short end of the stick in this commitment. After all, those who get their supplies from West Germany fare well.²⁰⁰

Meanwhile, the Uhde factory experienced far-reaching difficulties in technical and administrative implementation in India. The problems were threefold: firstly, Uhde's employees described "unbelievable" bureaucratic challenges, especially concerning tax agencies in India. This led *inter alia* to long delays in deliveries. The second set of problems concerned Uhde's limited experience as a construction company. Uhde was not used to creating turnkey businesses, as their activities were usually limited to the planning phase of an operation. Underestimating the costs of building the foundations of a plant, they were to embroil their

¹⁹⁸ Uhde Ingenieurbüro, "Wirtschaftsbericht," Brief an die Landeszentralbank. ThyssenKrupp Archives, Duisburg: TKU/101.

¹⁹⁹ Kommission für Auslandsinvestitionen und wirtschaftliche Entwicklung: Internationale Investitionsversicherung, "Umfrage an 41 Ländergruppen der IHK. Meinung des Unternehmertums über die Zweckmäßigkeit einer internationalen Versicherungsprogramms (für potentielle Investitionen in sog. Entwicklungsländern), Dokument Nr. III/109," 02.12.1962), TKU/86, ThyssenKrupp Archives, Duisburg; Uhde Ingenieurbüro, "Geschäftsführersitzung," 01.10.1961, TKU/69, ThyssenKrupp Archives, Duisburg.

²⁰⁰ "Binden wir unsere Mittel nicht, wie es alle anderen tun, so waschen wir mit unserem Champagner das Geschirr fremder Leute auf. (...) Entwicklungshilfe und langfristige Exportfinanzierung kommen aus derselben staatlichen Wurzel. Das ist das Geld der Steuerzahler. (...) Niemals kämen die Entwicklungsländer bei der Bindung zu kurz. Denn wer sich von Westdeutschland aus beliefern lässt, fährt gut." Leonard Stitz-Ulrici, *Der Export muss alles tragen*, June 1962, TKU/87, ThyssenKrupp Archives, Duisburg, (translation by the author)..

Indian partners in long re-negotiation processes. The third set of problems concerned the collaboration with Indian engineering partners. Uhde was in charge of a part of the construction works only. The Indian Fertiliser Corporation took over the second part of the fertilizer plant, where the ammonia was processed into nitro-limestone. Uhde would have preferred to be responsible for the whole fertilizer plant and made an offer to that effect.

However, giving contracts to Indian industry was more attractive to the Indian government because domestic companies accepted Indian rupees and were cheaper in a situation of scarce foreign currency. The Indian partners had already acquired experience with another fertilizer factory in Nangal, which they applied in Rourkela to save funds. The collaboration, however, was not effective and led to long delays. When the plant tried to begin operations in 1961, Uhde, on the one hand, did not receive enough coke gases from the steelworks, which did not run on full capacity. On the other hand, the construction process of the Indian Fertiliser Corporation took much longer than expected and the connection between the two parts of the plant did not work out as planned.²⁰¹ Therefore, the plant operated solely on stream in February 1963, after long delays.²⁰²

The case of the fertilizer plant exemplified how development aid, foreign policy, and company interests went together. Uhde recognized that development aid was an opportunity to improve its own sales opportunities and, consequently, the corporation sought support from the West German Federal Foreign Office. The Federal Foreign Office used the link between companies and developing countries as a valuable resource for asserting domestic and foreign policy interests, promoting only its own industry, with the technical expertise of the companies improving the international prestige of the Federal Government.²⁰³ Similar to the development policies of the United States, West German development aid also aimed to further the global liberalization of markets, to contain communism and to secure access to markets and raw

²⁰¹ Uhde Ingenieurbüro, "Chronik von Dr. Johann David Gerstein," TKU/1, ThyssenKrupp Archives, Duisburg.

²⁰² Uhde Ingenieurbüro, "Bericht der Ingenieur-Abteilung IV," 02.16.1960, TKU/54, ThyssenKrupp Archives, Duisburg.

²⁰³ Unger, "Export und Entwicklung," 77.

CHAPTER III

materials.²⁰⁴ Yet it would be wrong to assume that Western development aid acted as a closed bloc. Rather, in fertilizer projects, multinationals competed with each other, just as their governments did, to strengthen their national economies and foreign trade. These multinationals lobbied for their respective governments to apply development aid in a way that would create the best possible financial conditions for their own business investment. Apart from the United States, many other donor countries opened alternative paths for their nation's companies to expand to India, making good offers in terms of project funding.

After the end of colonial rule and the accompanying need for consumer and capital goods to foster economic development, investments in India were a great opportunity for multinational corporations to expand business. As a result, corporations of many nationalities competed for construction projects in fertilizer production in the 1950s and 1960s. Tenders for the engineering and construction of the fertilizer factories did not only negotiate the cost of services but also the financing of projects by means of development aid. Hence, corporations were dependent on their national governments to provide cheap financing through the allocation of development aid to win tenders.

In addition, US corporations aimed to profit from the expansion of the Indian fertilizer industry, but on a larger scale. In the year of the opening of the Rourkela fertilizer factory, India started negotiations with a consortium of US companies headed by the San Francisco-based engineering corporation, Bechtel, for the construction of five large factories, each turning out 750 tons of nitrogen per day. Yet the negotiations failed in 1965 because the consortium exerted too much pressure and made far-reaching demands regarding the set-up of the new facilities. The Indian government, despite heavy political pressure from the US government, only fulfilled these demands partly.²⁰⁵ This case exemplifies the interchanges and influence of US private industry on foreign policy-making, and allows us to analyze India's domestic response.

²⁰⁴ Unger, "Export und Entwicklung," 69.

²⁰⁵ Cullather, *The Hungry World*, 208.

**THE BECHTEL CONSORTIUM AND INTERNATIONAL PRESSURES TO STRENGTHEN
THE PRIVATE SECTOR IN FERTILIZER PRODUCTION, (1963–1970)**

In 1963, India did not have the production capacity to produce sufficient fertilizer on its own for its estimated future demands. Consequently, some parts of the Indian government were very open to the idea of a large-scale project headed by Bechtel and funded by development funds. Bechtel had experience in construction work in India in the private as well as in the public sector. With the Fertilizer consortium, its executive, Stephen D. Bechtel, envisaged new projects on a far greater scale: he wanted to build all of the fertilizer plants needed to cover the increasing demands of intensified agriculture: five large factories with a capacity of 750 tons of nitrogen per day.

Bechtel, himself a member of the board of trustees of the Ford Foundation, visited India in 1963 and discussed India's food and fertilizer problems with Douglas Ensminger, a representative of the Ford Foundation for India and Nepal.²⁰⁶ At the time, the Ford Foundation was the most important donor for rural development projects in India. Namely, the foundation was highly invested in Community Development. Similar to the US Embassy and US AID officials, Ensminger was convinced that chemical fertilizers had to be a major element in any program for increasing food production.²⁰⁷ In 1963, Ralph M. Dorman, Bechtel's Vice President, held discussions with officials of the US Embassy and US AID mission, who felt that chief members of the Government of India would be more receptive to the idea of a massive fertilizer program at the present time than they had been in the past. They had a new sense of urgency regarding India's food and fertilizer problems, and their programs for economic assistance to India had suffered a major defeat in loss of prestige, when the Russian Government took the Bokaro steel project after the US Government rejected it.

²⁰⁶ Ford Foundation, "For Release Sunday, December 11, 1960 : Stephen Davidson Bechtel," 12.11.1960, Folder 203, Box 7, Series Press releases, 1951-1975, 1990-1993, Ford Foundation records, Rockefeller Archive Center, Sleepy Hollow, NY.

²⁰⁷ Douglas Ensminger, "The Ford Foundation and Agricultural Development in India," 1965, Report 000283, Catalogued Reports, Ford Foundation Records, 30; Ashok Kapoor, *International Business Negotiations: A Study in India* (New York: New York University Press, 1970), 20, 314.

CHAPTER III

The US Embassy and US AID mission in India were therefore likely to foster a program, which would enhance the American image in India, and, at the same time, address one of India's most pressing issues. Despite the strong political support, the negotiations failed. Similar to the negotiations with the Indian government over the steel mill plant in Bokaro, the United States ran into the trap of trying to force a change of course in Indian policy towards privatization of its public sector. These attempts deterred the Indian government, which pursued a non-alignment strategy and was intent on its independence.²⁰⁸ Hence, despite the financial needs of the Indian government in the expansion of the fertilizer industry, political backing by the US Government was one of the reasons for the failure of negotiations, according to the economist Kapoor.²⁰⁹

The US ambassador to India, Chester Bowles, met Bechtel's vice president, Dorman, in May to explore the idea of the massive fertilizer program and felt that Cooley funds should cover the rupee costs of the project. In his view, the fertilizer project could be a useful and realizable demonstration of the superiority of US corporations in response to the Russian sponsorship of Bokaro. However, the incentives of US AID did not suffice to bring the negotiations between the companies of the consortium and the Indian government to an agreement.

The US companies had a broad bouquet of demands, which opposed the fertilizer production and marketing regulations in place. During the negotiations, the consortium insisted on company control over prices, distribution, and credit arrangements, which the Indian administration formerly controlled. Furthermore, the participating oil companies, Gulf and Texaco, insisted that the production of fertilizers was to be based on imports of their crude oil—a demand difficult to fulfill in the context of scarce foreign exchange. The oil companies were an important source of foreign exchange, so that the other companies were not able to ignore these demands, which reached far beyond their own interests in the program. Hence, there were substantial conflicts among the participating corporations and supporting agencies about the terms of the cooperation and the extent of the demands posed to the Government of India. Yet, in general,

²⁰⁸ Unger, "Export und Entwicklung," 82.

²⁰⁹ Kapoor, *International Business Negotiations*, 45, 49, 284–88.

the demands of the consortium were supported by the World Bank, United Nations, and US advisors in a manner that historian Nick Cullather describes as a “forceful program.”²¹⁰ The participating multinational corporations, however, were not speaking with one voice: they had their individual agendas, even as they aimed to collaborate in the implementation of a program on a ‘massive’ scale.²¹¹

In the case of the massive fertilizer program, the Indian government reacted negatively to the close and active association between the corporations and the US government, as well as to alleged threats of reductions in US aid to India. Particularly sensitive to questions of sovereignty and self-determination, the Indian government feared a regime of foreign direct investments. However, the consortium did not show much sensitivity to the postcolonial needs of self-determination; its proposed conditions severely limited India’s sovereignty and autonomy with respect to policy decisions. For example, the consortium demanded the most favorable treatment for its fertilizer projects, public or private, for the next ten years.²¹² This ignored the Indian efforts to establish its own engineering capabilities.

The Bechtel consortium presented a paradoxical understanding of free market capitalism. It demanded a majority share in the capital structure; managerial and technical control during construction; and control over prices, marketing, and distribution for an indefinite period.²¹³ Moreover, Bechtel suggested using PL 480 funds, Cooley loans, to establish a credit system for farmers. In his vision, this credit should only be available to those farmers who were buying fertilizers from the consortium. Bechtel and Subramaniam, India’s Minister for Agriculture and Food, came to head over this issue, and it turned into a source of conflict between US AID and the consortium, as it contradicted the ideal of market liberalism. Both US AID officials and Subramaniam believed in the efficiency of free markets to lower prices, and therefore argued in

²¹⁰ Cullather, *The Hungry World*, 208.

²¹¹ Kapoor, *International Business Negotiations*, 45.

²¹² Kapoor, *International Business Negotiations*, 45, 49, 284–88.

²¹³ Francine Frankel, *India’s Political Economy, 1947–1977: The Gradual Revolution* (Princeton: Princeton University Press, 1978): 269.

CHAPTER III

favor of a free market for the sale of fertilizers.²¹⁴ Yet, officially, Bechtel described the massive fertilizer program in terms of “free enterprise” promotion:

“A program is proposed that can avert the critical Indian food shortage now in prospect. This program is based on American free enterprise and initiative, combining into a single force the management and technical talents of several strong American organizations in combination with Indian associates, and proceeding under an accelerated schedule with full cooperation of Indian and US governments.”²¹⁵

But whilst US companies like Bechtel made a case for private enterprise and its possible beneficial effects on the Indian economy in their negotiations, they were at the same time insisting on an assured rate of return, through a guaranteed take-off price for their fertilizers. Similar to DeKalb’s market entry, the foreign investors of the consortium tried to secure terms that would put them in a privileged position vis-à-vis Indian or other foreign investors.

Similar to DeKalb’s entry to the seed market, the ideology of free-market capitalism served rather as a rhetorical tool than as a program to be realized. The competition in a free market was there for others, but for themselves, most companies demanded government guarantees for their investments, and the enforcement of legal regulations and institutions to secure their market position. Contemporary observers, such as Simon Williams, found a similar, larger pattern in the behavior of corporations negotiating in so-called developing countries (here he refers to American investors):

The American investor overseas often presents a curious picture. He is the symbol of free enterprise. He is the voice of opposition to government control. Competition is his source of nourishment. So it seems to others, and many Americans believe it to be a true picture. Yet, in a far off country, the same investor aggressively pursues protection and subsidy. He pleads to eliminate competition. He shrinks from risk. The confusion which results is natural.²¹⁶

India was one of the largest potential markets in so-called developing countries to be developed. Thus, it was in the focus of many corporate leaders who saw development aid as a means to expand their business to the so-called developing world. West German, US American, and

²¹⁴ Kapoor, *International Business Negotiations*, 78.

²¹⁵ Bechtel, Inc., as quoted in: Kapoor, *International Business Negotiations*, 30.

²¹⁶ Simon Williams, as quoted in: Kapoor, *International Business Negotiations*, 242.

corporations of other national origins demanded strong support of their national governments—rarely this had to do with the expansion of ‘free’ markets, which they rather used as rhetorical tools.

India attempted to adapt its terms to those of the consortium in a slow, incremental way. However, the policy changes it proposed did not meet the expectations of the foreign investors, and were merely a compromise—a compromise that made the consortium cancel the project altogether in 1965. With this decision, the Indian government was set back in its plans to establish sufficient indigenous fertilizer manufacturing capacity to meet India’s projected needs. Moreover, when the negotiations failed, India’s bargaining position was worsened in negotiations with other investors for the construction of fertilizer plants. Like the Indian government, foreign investors, too, anticipated a critical shortage of fertilizers, and could therefore better enforce their terms.

Most importantly, the Indian fertilizer strategy changed fundamentally in the mid-1960s, in terms of agricultural policies and regulations of foreign direct investments. This can be interpreted as but was not necessarily the result of the negotiations of the India consortium. It was rather indicative of a changing mentality in the Indian administration after Prime Minister Jawaharlal Nehru’s death in 1964, and to a more limited extent the result of foreign pressures from the World Bank and the United States.

INDIAN FERTILIZER POLICIES IN THE LATE 1960S

Monkombu Sambasivan Swaminathan, researcher at the Indian Agricultural Research Institute (IARI), brought the attention of Indian policy-makers to the high-yielding wheat varieties developed by Norman E. Borlaug in Mexico, and started a breeding program in 1962. At the time, he was “virtually alone among Indian agronomists” to rely on varieties with high nitrogen response and a trust in farmer’s reaction to price incentives.²¹⁷ This strategy found more support after the death of Nehru in 1964. Nehru’s successor, Lal Bahadur Shastri, initiated a change toward a new agricultural strategy relying on chemical fertilizers. Shastri did not share Nehru’s

²¹⁷ Cullather, *The Hungry World*, 195; Perkins, *Geopolitics and the Green Revolution*, 234–35.

CHAPTER III

passion for planning and was more open to the criticisms of Indian business leaders like G.D. Birla about the position of the private sector in the Indian economy.²¹⁸

In 1964, Shastri appointed a new Minister of Agriculture, Chidambaram Subramaniam, former Minister for Steel and Industrialization. When Subramaniam became Minister for Food and Agriculture in June 1964, the ministry had a reputation of being powerless. However, Subramaniam presented a big plan to modernize agriculture, which in its realization turned into the Green Revolution. Looking for a qualified chief secretary, he asked the Ford Foundation for advice. The Ford Foundation officials recommended B. Sivaraman.²¹⁹ Subramaniam appointed B. Sivaraman, who used to be Orissa's chief secretary and who had a long career in agriculture, to head a committee of fertilizers. The committee travelled all over India, collected information and submitted an extensive report. Based on its recommendations, the governance of fertilizer production and distribution shifted remarkably from the public to the private sector.²²⁰

In its 1965 report, the Sivaraman Committee made policy recommendations on how to guarantee availability of fertilizers at fair prices (including in remote corners of the country); how to build a good fertilizer distribution system by activating a cooperative sector; and how to carry the message of balanced fertilizer application all over the country.²²¹ It called for the elimination of monopolies (of cooperative trade) and argued in favor of a system in which "private agencies would also be allowed a central role as fertiliser distributors." Hence, the committee argued in favor of removing market-entry barriers such as price controls and allowing ownership of manufacturing facilities by foreign companies. The private sector should have the "freedom to market their products" and would no longer need to sell their products to the pool.²²²

²¹⁸ Engerman, *The Price of Aid*, 236.

²¹⁹ Harwood, "Was the Green Revolution intended to increase food production?," 4.

²²⁰ Gopakumar M. Nair, *Story of an Era Told Without Ill-will* (Kottayam, Kerala: DC Books, 2014): 419.

²²¹ F.J. Heredia, "From Distribution to Marketing," ed. T. M. Alexander (New Delhi: The Fertilizer Association of India, 1980), 172–74.

²²² Broehl, *The Village Entrepreneur*, 34–5.

Since 1958, the World Bank had advocated a larger role for private capital, because it perceived the public sector programs to be too ambitious.²²³ In October 1965, the World Bank published a similar message in its report—“Bell’s Mission’s Report to the President on India’s Economic Development Efforts”—known as the Bell report. This report and the policies it recommended reflected the pressures exerted by the World Bank on India, to introduce what Subramaniam called “new agricultural strategy”: introducing the Green Revolution package by changing pricing policies on inputs and expanding the production of fertilizer. Historian David C. Engerman observes that the “rural sector became something of an obsession for American and World Bank officials.”²²⁴

This included US President Lyndon B. Johnson, who was at the peak of his short tether policy toward India in 1965. After the military clashes with Pakistan, the US government suspended food deliveries to India and made future deliveries conditional upon changes in agricultural strategy and weekly reporting. The Johnson administration used its diplomatic leverage and the Indian dependence on PL 480 food deliveries to put pressure on the Indian government to change its attitude toward (US) foreign investments and purchase fertilizers to fight food shortages. Similarly, the US AID India chief, John Lewis, focused on the usage of chemical fertilizers, which was for him the single most important element of a new agricultural strategy. He supported the consortium in their plans to construct new plants.²²⁵ Engerman stressed, “When the Indian talks with Bechtel stalled in spring 1965, Indian officials were so concerned about US AID pressure that they quietly inquired whether the failure to reach a deal would mean an immediate reduction in economic assistance.”²²⁶

The Indian prime minister, Bahadur Shastri, decided to raise the farmer on a par with the soldier, using the slogan: “Jai Jawan: Jai Kisan.” For him, the fight for self-sufficiency in food production to overcome dependencies on food imports turned into a matter of national security.

²²³ Francine Frankel, *India’s Political Economy*, 269.

²²⁴ Engerman, *The Price of Aid*, 250.

²²⁵ Ahlberg, *Transplanting the great society*.

²²⁶ Engerman, *The Price of Aid*, 250.

CHAPTER III

The person in charge to reach self-sufficiency in food production was Chidambaram Subramaniam. He later recalled “epic battles” in his efforts to introduce the “new strategy” with the support of B. Sivaraman. Sivaraman pushed for massive imports of fertilizer when India was still lacking domestic production capacities, ordering 2 million rupee’ worth of fertilizer from the United States by the end of 1965.²²⁷ Historian Nick Cullather argues that, “fertilizer presented another bottleneck,” pointing toward the scarcity in the Indian fertilizer situation and difficulties in increasing supplies:

Overcoming the scarcity would require a sixfold increase in domestic output, but the public sector monopoly, coupled with foreign exchange constraint, offered almost no room for growth. Subramaniam’s deputy, B. Sivaraman, led an investigation that determined that India’s fertilizer prices— higher than in any other country— were the principal impediment. India could not finance enough additional capacity on its own even if it wanted to, and existing factories faced “severe shortages of experienced technical and managerial personnel.”²²⁸

The public sector funded most investments in fertilizer capacities through the end of the third five-year plan, but with the expansion of the Indian Agricultural Development Programme, 1965, it was unclear where the scarce fertilizer should come from. Within the established legal framework and with scarce foreign exchange to hand, the Indian government was struggling to find funding for the construction of more fertilizer plants. Furthermore, beyond the tense currency situation, rising fertilizer imports would have put the country in a situation as hazardous as the dependence on food grain.²²⁹ Therefore, from the Indian perspective, it made sense to expand production facilities within the country. Private investments in the Indian fertilizer sector, although they had begun prior to 1965, expanded rapidly in the context of the Green Revolution. A revision of the fertilizer policy in December 1965, in line with some suggestions by the Sivaraman committee report, liberalized and encouraged private investment in order to build up fertilizer capacity quickly. The Indian government made some important amendments to allow for foreign ownership of plants and the

²²⁷ Cullather, *The Hungry World*, 205, 222.

²²⁸ Cullather, *The Hungry World*, 208.

²²⁹ Bajjal, “Fertiliser Policies and their impact of fertiliser production and consumption,” 266–67; Easo John, “Growth in Fertiliser Consumption in India,” 157–63.

right to set prices (for 70 per cent of the production, and 7 years).²³⁰ Hence, the cumulative investments of the private sector between 1965 and 1973 grew to be more than sixteen times larger than the investments before 1965.²³¹

It would be too shortsighted to argue that these policy changes were the mere result of international pressures executed on the Indian government. The political scientist, Ashutosh Varschney, points to the changes in administration and leadership after Nehru's death in 1964 to argue that "external actors leaned against an open door; they did not force the door open."²³² Domestic power balances changed within the Indian apparatus, allowing agricultural policy-makers to introduce policies relying on technological improvements and price incentives, instead of the institutional approach that Nehru had favored in his Community Development strategy. Nehru argued that relying on chemical fertilizers was "a dangerous tendency because it took away the minds of cultivators from the use of [...] manures [...] used in other countries"²³³, namely China, where agricultural production had increased at a faster pace without the use of chemical fertilizers.²³⁴

In contrast to Nehru's refusal, the shift to relying on foreign direct investments and chemical fertilizers made Indian policy-makers appear in public as vassals of the US. For these policy-makers, who received resources from international donors to fund policy changes, the publicity created by the Johnson administration was not advantageous. The Minister of Food and Agriculture, Subramanian, for whom fertilizers were "[t]he king-pin of agricultural development in the modern age," explained in 1978:

²³⁰ Heredia, "From Distribution to Marketing," 173; W. D. Posgate, "Fertilizers for India's Green Revolution: The Shaping of Government Policy," *Asian Survey* 14, no. 8 (1974): 746.

²³¹ Baijal, "Fertiliser Policies and their impact of fertiliser production and consumption," 261–63.

²³² Ashutosh Varschney, *Democracy, Development, and the Countryside: Urban-Rural Struggles in India* (Cambridge: Cambridge University Press, 1995): 303.

²³³ Jawaharal Nehru, as quoted by Ashutosh Varschney, "Ideas, Interest and Institutions in Policy Change: Transformation of India's Agricultural Strategy in the Mid-1960s," *Policy Sciences* 22, no. 3 (1989): 297.

²³⁴ Schmalzer, *Red Revolution, Green Revolution*.

[...] Johnson always had a sense of self-importance. If anything good or important was happening in the world, it should be a Johnson initiative [...] he thought the [...] Indian farmer, the Indian minister and the Indian scientist were not adequate, and that he should take a hand in the initiation of this strategy. He reiterated in speeches that India should adopt this new technology, which as a matter of fact, created problems for me in India. The speeches gave ammunition to those who were attacking me on the grounds that I was following American advice [...] We had already announced and taken these steps and I had to tell people that President Johnson was telling us nothing new [...] The fact that we had to send our requirements of foodgrains to [President Johnson] every month created many difficulties not only among the communists but amongst people who were sympathetic to America.²³⁵

Looking closer at Chidambaram Subramaniam's biography, overlaps of the industrial and agricultural spheres become visible. In the beginning of his political career, Nehru took Subramaniam to New Delhi, who appreciated his technocratic attitude.²³⁶ In 1962, before he engaged in agriculture, Subramaniam had become Minister of Cabinet Rank in Charge of Steel (1962-63) and Steel, Mines and Heavy Engineering (1963-64). Only after Jawaharlal Nehru's death in 1964, was he placed in charge of Food and Agriculture (1964-67). This change of departments was widely interpreted as a demotion, but as Minister of Food and Agriculture, he grew the ministry's funds quickly. Subramaniam approached the problem of self-sufficiency in similar technocratic terms as he did the production of steel, arguing: "To produce more food with less fertilizer is as impossible a task as to produce more steel with less iron ore [...] Better seeds for agriculture are as crucial as better machine tools for industry."²³⁷

By playing a decisive role in the introduction of intensive chemical fertilizer application and the dissemination of high-yielding varieties of seeds, he continued in agriculture where he had ended in his former field of expertise: setting up new industrial production facilities. By stressing the importance of fertilizer in rural development, he was proposing that industrial and rural development were strongly interlinked.²³⁸ Furthermore, he thought of cultivators being

²³⁵ Chidambaram Subramaniam, *The New Strategy in Agriculture*, (New Dehli: Vikas, 1979), 53. As cited in Ashutosh Varshney, "Ideas, Interest and Institutions in Policy Change."

²³⁶ Ashutosh Varshney, "Ideas, Interests and Institutions in Policy Change," 300.

²³⁷ Ashutosh Varshney, *Democracy, Development, and the Countryside*, 303.

²³⁸ Chennai, "CS ushered in Green Revolution," *The Hindu*, n.d., <https://www.thehindu.com/todays-paper/tp-miscellaneous/tp-others/cs-ushered-in-green-revolution/article28052960.ece>.

similar to entrepreneurs—with a propensity to change their behavior if price incentives were right, in order to maximize profits. In that regard, he introduced a logic to agricultural policy-making that (multinational) companies also promoted. He reflected on this continuity as follows:

My move from steel and heavy industries to agriculture was a big change as far as the nature of the work and the job was concerned, but perhaps this in itself was an advantage because I was able to look at agriculture with a completely new perspective. For example, in industry, no industrial unit can progress and succeed unless it is a profitable concern. If it is a losing concern, no industry can prosper. I looked at agriculture from a similar point of view and, after study and analysis, came to the conclusion that Indian agriculture was a losing concern for the farmer. He did not receive a return commensurate with his labour or with the investment he was prepared to make. This was mainly because of the price policy, which had been adopted since independence.²³⁹

Subramaniam discussed issues of rural development in terms of demand and supply of agricultural inputs and prices for food grains. By contrast, Nehru addressed the issue of rural poverty in the 1950s through institutions of community development or rural inequality.²⁴⁰ Subramaniam's approach had implications for the industrial as well as the agrarian sectors of the Indian economy, as the use of Rockefeller high-yielding varieties required changes in Indian "fertilizer supplies in order to prevent the new agricultural strategy from being undermined for want of this essential input."²⁴¹

The high-yielding varieties that plant scientist Norman E. Borlaug and his colleague, Ignacio Narváez (one of Borlaug's early trainees), had imported from Mexico, needed (besides sufficient irrigation) high quantities of fertilizer to thrive.²⁴² With great conviction, Borlaug, the so-called 'father' of the Green Revolution, chose a plant breeding strategy that selected those varieties that responded best to nitrogen fertilization. Furthermore, when consulting governments in so-called developing countries, he argued strongly in favor of increasing fertilizer production and imports to increase food grain yields. For example, in order to see

²³⁹ Chidambaram Subramaniam, *The New Strategy in Agriculture* (New Delhi: Vikas, 1979), 4. As quoted in: Ashutosh Varshney, "Ideas, Interest and Institutions in Policy Change."

²⁴⁰ Engerman, *The Price of Aid*, 238.

²⁴¹ Posgate, "Fertilizers for India's Green Revolution," 734.

²⁴² Cullather, *The Hungry World*, 62.

CHAPTER III

Pakistan become self-sufficient in the production of wheat by 1968 (earlier than intentionally planned), the not-yet-Nobel-laureate Borlaug pushed Pakistan's president, Ayyub Khan, to increase imports of fertilizers, telling him: "your major problem is to get enough fertilizer through the port of Karachi [...]." ²⁴³

The idea suggests that the changes in India's agricultural strategy that led to the Green Revolution were imposed by the United States and the World Bank to enforce a complex of economic power interests. However, the failure of the fertilizer consortium's negotiations shows that US companies could not simply change Indian fertilizer policy according to their ideas. The conditions created by Indian policy-makers to attract the investments of US companies did not suffice to meet their expectations and, therefore, the consortium did not realize the large-scale project. The fertilizer strategy changed, nonetheless. Yet, above all, shifts in domestic political power after Nehru's death strongly determined these changes.

Advocates of a fertilizer- and price incentive-based agricultural development strategy got a louder voice and the means to implement their visions. In their view, in order to achieve a rapid increase in India's food production, the fertilizer industry in India had to be further expanded. The technical and engineering skills of multinational companies played a central role in this. Even though the Indian government was able to choose from various offers of development assistance, it was initially dependent on the technical expertise of these companies.

TECHNOLOGICAL SPILL-OVER EFFECTS IN THE CONSTRUCTION OF FERTILIZER PLANTS

The technology and engineering required for basic fertilizer production remained with a few multinational corporations in the 1960s. The proprietary control of multinational corporations over process expertise and basic engineering was ensured in three ways: firstly, processes were patented wherever possible; secondly, if patenting was not enforceable, corporations sought to control process know-how and technologies; thirdly, through licenses distributed to only a few corporations. Contractual provisions made sure that critical machinery was bought from a

²⁴³ Rockefeller Foundation Program in Agriculture, "Oral History: Norman E. Borlaug," June 1967, Folder 7, Box 17, Series 13 Oral Histories, Rockefeller Archive Center, Sleepy Hollow, NY.

specific supplier. This meant that corporations tried to ensure that the transfer of knowledge took place within the limits of the continued dependence on the technology supplier. Nonetheless, the competition between engineering companies with respect to improvements to processes and designs grew in the 1960s and 1970s. With growing intensity in the 1970s, developing countries sought a fuller understanding of the basic processes.²⁴⁴

In Rourkela as well as in the massive fertilizer program, the Indian government made sure that the investments in the construction of factories went hand in hand with the learning processes of Indian engineers. The Rourkela fertilizer plant was the first fertilizer plant in which Indian engineers took the responsibility for a second part of the fertilizer production: the production of nitro-limestone. The Italian engineering company, Stamicarbon, supported this construction project, executed by the Indian Fertiliser Corporation. Yet, the second part of Rourkela's fertilizer production was the first time an Indian engineering bureau handled a detailed design, procurement, and the project management.²⁴⁵ With the declared goal to develop indigenous resources, the idea to have a standardized plant design for several plants, as suggested by Bechtel in the fertilizer consortium, found strong opposition in the Indian fertilizer industry. This approach had potentially hindering effects on the Indian engineering industry.²⁴⁶ The Managing Director of the New Delhi fertilizer manufacturer, Indian Explosives Ltd., S.S. Baijal, recalled in 1980:

From a situation in the early years when imported technology was transferred mainly by leading foreign engineering contractors, practically always on a turn-key basis, the indigenous capabilities improved over the period so that by the early '70s most of the engineering work could be done locally. Although some of the early efforts in indigenizing the technology have proved expensive as a number of plants have not operated satisfactorily even until today, this cumulative experience has definitely contributed to the process of technological maturity in the Indian industry. In fact, the

²⁴⁴ United Nations Centre on Transnational Corporations, "Transnational Corporations in the Fertiliser Industry," 51–55.

²⁴⁵ Pothen, "Toward Technological Self-Reliance," 119.

²⁴⁶ Kapoor, *International Business Negotiations*, 20.

CHAPTER III

country today is capable of engineering and implementing large fertiliser projects based on imported process technology.²⁴⁷

When the negotiations with Bechtel for the construction of five plants on a turn-key basis failed, planning and development bureaus of state-owned fertilizer corporations had already made progress in the thrust to design entire plants on their own. The Indian engineering industry had grown in capabilities along with the demand of the Green Revolution.²⁴⁸ Hence, regarding the construction of fertilizer plants, technological spillover effects became an important issue in the collaboration of the Indian government and multinational corporations.

CONCLUSION

Particularly in the 1960s and 1970s, with the Green Revolution, India expanded its fertilizer-production capacity, but often through state-owned enterprises such as the Indian Fertiliser Corporation. Due to high capital costs for the construction of manufacturing facilities and the risks of nationalization, the fertilizer industry had traditionally been in the hands of the public sector. The role of multinational corporations was initially limited to pre-investment studies, plant designs and engineering, as well as responsibilities in the plant construction. Only in some cases did multinationals participate in ownership.²⁴⁹

While some historians have focused on the pressures exerted by the US government to shift the focus of Indian planners towards increasing the production of fertilizers in India, the longer history of the fertilizer industry in India showed that India's rural strategy did not merely change because of a foreign intervention. On the one hand, the Indian administration supported the

²⁴⁷ Bajjal, "Fertiliser Policies and their impact of fertiliser production and consumption," 270.

²⁴⁸ Pothen, "Toward Technological Self-Reliance," 121.

²⁴⁹ The British Corporation Imperial Chemical Industries held an unknown part of India Explosives from 1969, with an estimated production capacity of 339,000 metric tons of nitrogen in 1982; Amoco Oil held a quarter of Madras Fertilizer Ltd. from 1972, with a production capacity of 203,000 metric tons; US Steel held 36 per cent of Zuari Agro Chemicals from 1973, and Chevron and IMC held 47 per cent of Coromandel Fertilizers with a nitrogen capacity of 87,000 metric tonnes of nitrogen and 104,000 metric tons of Phosphate in 1982. (United Nations Centre on Transnational Corporations, "Transnational Corporations in the Fertiliser Industry," 3–40.)

expansion of the chemical fertilizer industry, and, on the other, other donor countries provided alternative funds, which limited India's dependency on the United States or the Soviet Union.

Some European countries and Japan had their own business development and development aid agendas. They participated in a highly competitive environment in the contracting of large-scale engineering projects, supported by development aid funds. These countries tried to offer the best funding opportunities for their companies. Multinational corporations used this context effectively and used the Cold War conflict rhetorically in order to improve the funding situation of their projects with the help of development funds. After experiencing the strong support of the West German government for Rourkela, the engineering company Uhde learned to lobby more confidently for support. Likewise, other corporations organized themselves in the development decade in the 1960s and lobbied for a larger share of tied aid in West German development projects.

This environment had many advantages for Indian policy-makers. They were using this competitive environment to raise financial demands and to choose among several offers. Indian policy-makers had an agenda to increase the production of fertilizers and could use the competition between corporations to get the best funding deals. Uhde served as an example of a company for which the details of the export insurances and development credits counted for the success of its mission abroad. West German development aid acted as its strong supporter. The industrialization of India needed the technical expertise of (in this case) West German corporations. For the expansion of the Indian fertilizer industry, the expertise and experience of multinational engineering corporations were indispensable. Hence, the Green Revolution opened the gates for stronger cooperation of governments of so-called developing countries with corporations specialized in the construction of manufacturing facilities.

In the negotiations with a US American consortium, inherently divided by different interests, representatives of the Indian government sought self-determination and self-sufficiency in domestic fertilizer production. The negotiations failed despite the strong political pressure exerted on the Indian government by the US government, the World Bank, and the Ford Foundation. Bechtel, an engineering corporation taking the lead in the negotiation, could not win enough support for its massive fertilizer program and failed to play off its political contacts

CHAPTER III

with the US government and the Ford Foundation effectively. It underestimated the Indian steadfastness on issues of self-determination.

This case of failed negotiations shows that the US corporations, whether by themselves or in collaboration with their governments, could not push a project through easily in the context of a postcolonial nation seeking self-determination. This supports the argument of the political scientist, Eldridge, who in 1974 rejected the argument that there was a simple “Third World-Industrial World” confrontation in the Indian fertilizer industry. He pointed toward the shortcomings of the dependency model, analyzing collaborations between Western governments, and their official foreign aid sources, the Government of India, Indian private enterprise and foreign private investors. In his view, the relative power of the non-permanent alliances between different actors varied according to time and circumstances.²⁵⁰

The Indian fertilizer industry started to expand its fertilizer production facilities before the legislative changes of 1965 and the take-off of the Green Revolution in the late 1960s. One might assume that the changing fertilizer policies of the Green Revolution triggered this trend. Yet, as the case of the fertilizer factory in Rourkela shows, the construction of manufacturing facilities that opened in the mid-60s had already started in the late 1950s. It was already then that large multinationals started to compete for the open tenders for fertilizer (and other) factories that were often funded through development aid funds.

The short history of fertilizers in the context of the Indian Green Revolution shows three important things about multinational companies: firstly, Indian production capacities were mainly in the hands of public corporations. In order to expand production in the context of foreign currency crises, Indian corporations were interacting with multinational engineering corporations closely. Secondly, in these collaborations, multinational corporations were an important source of expertise and experience in the construction of fertilizer factories. The Indian government always had an eye on making sure that all construction projects led to learning effects for the Indian engineering industry. Thirdly, multinational corporations

²⁵⁰ Posgate, “Fertilizers for India’s Green Revolution,” 748; Philip J. Eldridge. *The Politics of Foreign Aid in India*, (Delhi: vikas publications, 1969).

interacted closely with their home governments in competitive tenders for lucrative fertilizer manufacturing construction projects. In these tenders, the terms set by development policies in terms of credits and foreign exchange counted at least as much as the price and the offer made by the corporation.

Looking more closely at the role of fertilizer in the Green Revolution in India also highlights the linkages of rural development strategies with strategies of industrialization. In a technocratic vision of rural development, policy-makers considered fertilizer to be a panacea. With the trust in Green Revolution technologies, Indian agricultural planners had to create industrial capacities to expand production. For agricultural planners relying on chemical fertilizers in the 'fight against hunger,' the thinking about the countryside changed: they compared agricultural land to an industrial complex, following the rules of supply and demand. To estimate the demands of fertilizers, planners used simplified and abstract models. Reading the food problem in terms of how to ensure sufficient fertilizer supplies, meant that all that was needed to solve the food problem were enough fertilizer production facilities—a challenge of industrial modernity that development policy-makers such as Chidambaram Subramaniam felt ready to face.

With Subramaniam as Minister for Food and Agriculture, an experienced industrial planner took the lead in the direction of Indian agricultural development. He had a variety of processes at hand to shape the fertilizer industry, including price setting, investment in fertilizer manufacture, and promotional programs such as credit mechanisms.²⁵¹ Thinking about rural poverty in terms of prices, supply and demand and agricultural production as industrial complexes excluded human-centered approaches and centered the focus of planners on agricultural supplies. With an industrial understanding of rural development, the Indian government made investment decisions that focused on the construction of factories rather than the establishment of education or health systems.

²⁵¹ Saha, "Food for Soil, Food for People," 259.

CHAPTER IV

DIFFUSING PESTICIDES IN THE FRAMEWORK OF DEVELOPMENT AID (1965–1970)

In previous chapters, I described multinational corporations mainly as beneficiaries of development policies that their home governments had initiated, in order to expand their spheres of political and economic influence. In these efforts, governmental actors often understood multinational corporations as reliable partners with important and indispensable technical and managerial expertise. In these chapters, we saw how the seed company DeKalb hesitantly expanded its business in India at the end of the 1950s. We also saw how engineering corporations such as Uhde lobbied for and relied on strong support of their home governments to finance the construction of fertilizer manufacturing facilities. By contrast, in this chapter, *Diffusing Pesticides*, I present multinational corporations in the late 1960s as independent actors taking a proactive role in the expansion of markets for plant protection chemicals. In the following, I describe pathways of collaboration between private and public actors from multilateral to bilateral approaches: how multinational corporations collaborated, firstly, with international organizations; secondly, with their national governments; and thirdly, with the Indonesian government.

Multinational corporations were especially active in the promotion of the third part of the Green Revolution package: plant protection through chemical inputs—namely, herbicides, pesticides, and insecticides. These chemical inputs spread rapidly in the course of the Green Revolution in the 1960s: not only did yields rise with the intensive use of fertilizers on high-yielding varieties, also did the consumption of plant protection chemicals. In India, total consumption amounted to 11,000 tons in 1963–64, rising to 30,000 tons in 1971–72, with a further increase to 77,000 tons in 1974.²⁵²

²⁵² A. J. Shore to Alexander G. Friedrich, “Impact of MNCs on World Economy,” 01.10.1973, Folder 8, Box 22, Industry Cooperative Program, FAO Archives, Rome.

Fertilizers had a growth-increasing effect on weeds, adversely affecting the harvest. Furthermore, monoculture cultivation made it easier for plant diseases and pests to spread. Chemical companies offered chemical responses to these hazards. Governments in so-called developing countries strongly promoted these so that more and more farmers resorted to chemical plant protection as part of their farming practices. This created a market for multinational chemical companies to distribute herbicides, pesticides, and insecticides—however, this market was not easily accessible due to the low capitalization of rural areas, the extensive need for farmers’ training, and complicated distribution and marketing networks. Hence, the promotion of potentially harmful plant protection chemicals in so-called developing countries required more cooperation between state and private actors than the marketing of other agricultural inputs. Governments were dependent on the cooperation with multinationals because so-called developing countries did not have the expertise to manufacture most pesticides, herbicides, and insecticides and had to import the chemicals needed for the intensification of agricultural practices, despite a lack of foreign currencies in the late 1960s.

The interests of multiple stakeholders in rural development converged in the promotion of chemical inputs. Multinational corporations, international organizations, governments, and farmers, all sought to benefit from pesticides’ sale, distribution, and application. Multinational corporations were interested in expanding their markets to new consumers on a worldwide scale. International organizations, such as the Food and Agriculture Organization (FAO), engaged in the ‘fight against hunger’ and trusted in policies of technological modernization that promoted the use of chemical inputs. Similarly, most governments of both donor and recipient nations shared the vision of a modern agricultural system that used the means of intensification and mechanization of the modes of agricultural production. For most farmers, the use of chemical inputs promised to decrease the workload of weeding their fields, and to stop the spread of plant diseases that put their harvests at risk. This convergence of interests led to diverse forms of cooperation, in which multinational corporations played a key role.

In the course of the 1960s, multinational corporations maintained regular correspondence with one another, and organized their lobby activities under the umbrella of development and food aid. These exchanges often took the form of institutionalized meetings, such as the FAO Industry Cooperative Programme (ICP) or the US American Agribusiness Council, founded in

1965 and 1967, respectively. With these programs, corporate lobbying institutionalized during the 1960s, so that corporations found ways to promote their ideas of development and to lobby for their business interests in influential development agencies. The ICP as well as the Agribusiness Council focused on strengthening cooperation between state and non-state actors on an international scale and aimed to organize corporate activities stretching across national borders. However, also without institutional support, some corporations such as Ciba found ways to participate in government programs, targeting the modernization of agricultural production.

In the first part of the chapter, I analyze the history of the Industry Cooperative Programme and the Agribusiness Council, and discuss the participation of multinational corporations in development aid projects. In the second part, I present a bilateral form of collaboration between a merger headed by a Swiss corporation and the Indonesian government in the agricultural development scheme *Bimas Gotong Royong* (1967–1970). This case study shows how corporate ideas of development played out in practice and illustrates the difficulties of companies and governments in developing countries that worked together. This chapter begins with an international lens on public-private cooperation in international organizations, before zooming in on the national level in the United States, and then shifting geographically taking into account experiences of public-private partnerships on the ground in a so-called developing country.

CASE I: THE INDUSTRY COOPERATIVE PROGRAMME, (1965–78)

In 1965, the Food and Agriculture Organization (FAO) and several industrial leaders set up the Industry Cooperative Programme (ICP) jointly with the aim to “helping to solve the world food problem and to stimulate economic growth in developing countries.”²⁵³ The idea was to initiate collaboration between multinational corporations and the public sector in order to promote agricultural development in rural areas using technologies provided by company members. The

²⁵³ Meeting of Steering committee and FAO/Industry Relations, “Industry joining FAO in program to combat hunger,” 06.20.1966, Folder FAO Task Force On Agro-Industries, Box 75, Collection PR 75, FAO Archives, Rome.

collaboration of governments and international organizations in agricultural development went hand in hand with their recognition of multinational corporations as experts of agricultural modernization. For governments in the Global South, the ICP portrayed itself as a “neutral device for relating industry’s marketing know-how, managerial skills, technology, and financial resources to agro-industrial development goals.”²⁵⁴

THE INITIATION OF THE INDUSTRY COOPERATIVE PROGRAMME (1965)

FAO’s Director General, Binay R. Sen, opened the door for corporate influence in his policy-making and aimed to turn multinational corporations into important partners in his Freedom-from-Hunger Campaign initiated in 1960.²⁵⁵ In order to fight hunger and poverty in rural areas, Sen tried to gather a broad coalition of actors from government, non-governmental organizations, private initiatives, and multinational corporations. Under his leadership, between 1956 and 1967, the FAO organized the first World Food Conference in 1963. This conference mirrored the growing concern of the international community about the contemporary world food situation.

In 1965, he started a cooperation with the World Bank (then named International Bank of Reconstruction and Development (IBRD)) in the form of the FAO/IBRD Cooperative Programme and with the aim to open new financial and technological resources for FAO’s pre-investment projects. With similar motives, and shortly thereafter, he proposed the concept of formal FAO-industry relations and initiated the ICP. He trusted that the cooperation with multinational corporations in official international development projects was an important next step in the global effort to combat hunger and malnutrition. In the Monthly Letter No. 90 to

²⁵⁴ Industry Cooperative Programme, “Cooperative Programme of Agro-Allied Industries with FAO and other United Nations Organizations,” 03.12.1973, Folder 8 Industry Cooperative Programme Company File, Box 22, Collection SP, FAO Archives, Rome.

²⁵⁵ Ruth Jachertz, “‘To Keep Food Out of Politics’: The UN Food and Agriculture Organization, 1945–1965,” in *International Organizations and Development, 1945-1990*, eds. Marc Frey, Sönke Kunkel, and Corinna R. Unger (Basingstoke: Palgrave Macmillan, 2014): 75–100; D. John Shaw, *World Food Security: A History since 1945* (Basingstoke: Palgrave Macmillan, 2007).

CHAPTER IV

Ministers of Agriculture and Development in August 1965, he expressed the hope that industry could launch a take-off in the fight against hunger:

[...] cooperation between FAO and private industry is both possible and mutually beneficial. [Our earlier experiences with industry] also make it clear that if this cooperation were intensified and applied to a much broader range of industries, this could result in significant stepping up of agricultural development and rural income in the broadest sense of the term. It might even constitute a decisive breakthrough for all our efforts.²⁵⁶

His attitude toward the participation of multinational corporations in rural development was controversial, because member nations of the FAO disagreed on their role in the world economy. The issue of the participation of multinational corporations in rural development related to the broader question of whether the FAO should support ‘capitalist’ approaches, which would provoke resistances among the socialist member states. Yet Binay R. Sen was able to enforce his vision of a broad alliance, especially, as he promoted corporate actors as indispensable providers of technical supplies in strategies of agricultural intensification. He argued that the collaboration with industrial actors potentially promised to provide better access for developing countries to agricultural inputs, and to cover the rising demands for fertilizers and pesticides. Furthermore, some FAO administrators, such as the Assistant to the Director General, Egon Gleisinger, wanted to use the expertise of agribusiness corporations as a pacemaker in the economic and industrial development of developing countries.²⁵⁷ The FAO’s own projects struggled with financial and personal constraints, so that the FAO officials understood multinationals as a source of expertise and funding to overcome their own shortcomings. By cooperating with multinational corporations, the FAO hoped not only to harness technological expertise, but also to find a source of knowledge and creativity for effective action.²⁵⁸

²⁵⁶ Freedom from Hunger Campaign, “Ad Hoc Meeting on FAO/Industry Relations,” 09.24.1965, Folder FAO Task Force On Agro-Industries, Box 75, Collection PR, FAO Archives, Rome.

²⁵⁷ Egon Gleisinger, “Relations with Industries,” 03.01.1965, Folder FAO Task Force On Agro-Industries, Box 75, Collection PR, FAO Archives, Rome.

²⁵⁸ Industry Cooperative Programme, “Cooperative Programme of Agro-Allied Industries with FAO and other United Nations Organizations,” 03.12.1973, Folder 8 Industry Cooperative Programme Company File, Box 22, Collection SP, FAO Archives, Rome.

For multinational corporations, the ICP offered an opportunity for long-term market development in the insecure investment climate of so-called developing countries. With the economies of the Global North slowing down between 1966 and 1976, corporations had an incentive to look for new markets and investment opportunities. Yet, reaching the very fragmented developing markets dominated by subsistence and small-scale farming was a considerable challenge for multinationals. Many corporations were skeptical about venturing into less developed markets, which, as they assumed, would come with high risks and offer low returns on investments. Economic analyst Eldridge Haynes observed that ventures in so-called developing countries were complicated due to poor transportation networks, unreliable power and communication networks, and, what he understood to be, “uneducated workers.”²⁵⁹

By entering the Industry Cooperative Programme of the FAO, corporate executives hoped for support in the complicated expansion to markets of so-called developing countries. However, most corporate leaders also used philanthropic and humanitarian arguments to explain their motivation. They argued that membership in the ICP was a social obligation to assist international organizations in their ‘fight against hunger.’ Stronger, however, was their wish to keep up with changing working conditions in the market of tomorrow. Companies feared that if they did not learn how to cooperate with host governments, local partners, and government agencies, then they would be outpaced by companies who did.²⁶⁰ The rhetoric usually followed the same structure: corporate leaders insisted on their philanthropic motives, but in financial decision-making, their maxim to make profits was stronger and turned into the decisive criterion in investment decisions.

In 1965, the ICP had 18 founding company members, mostly stemming from the United States. The FAO aimed to assemble a group of “leading industrialists” from North America and Europe, although the membership was open to any company engaged in the production and processing

²⁵⁹ Eldridge Haynes, “Statement before the National Advisory Committee on Food and Fiber,” 07.13.1966, Folder 9 Working Group on FAO Industry Relations, Box 44, Collection PR, FAO Archives, Rome.

²⁶⁰ W. Kniep, “Answers Questionnaire,” 10.27.1972, Folder 8, Box 22, Collection SP, FAO Archives, Rome.

CHAPTER IV

of agricultural products. In the initial phase of the program, Binay R. Sen explored possibilities with corporate executives mainly from the United States, and organized meetings in Chicago and New York.²⁶¹ The FAO hoped that once they had the backing of ten or twenty leading men in a certain industry group, the rest would follow.²⁶² Among the 99 companies organized in the ICP in 1974, the majority stemmed from the Global North—only a few companies from socialist states or the Global South. While in the beginning the majority of members were US companies, by the 1970s, the FAO became concerned about the low rate of participation among US companies.²⁶³ The ICP did not meet many expectations of the founding members, as the cooperation resulted in hardly any lucrative orders. Therefore, and because of the massive spending of the US government on development aid projects, it made sense for the US corporations to organize themselves on a national level. In comparison to the US development aid budget, the FAO's budget was simply too small.

The ICP had a rather small 15-member executive and a permanent secretariat at the FAO headquarters in Rome. The chair had to be a corporate executive, who served for intervals of two years.²⁶⁴ The companies funded the program with membership fees of US\$ 3,000 in the beginning and US\$ 5,000 later—a point of recurrent debate among the members. Senior executives represented their company in general committee meetings twice a year.²⁶⁵

²⁶¹ Christian Gerlach, "Illusions of Global Governance: Transnational Agribusiness inside the UN System," in *Food and Globalization*, ed. Alexander Nützenadel (Oxford, New York: Berg, 2008): 193.

²⁶² Egon Gleisinger, "Relations with Industries," 03.01.1965, Folder FAO Task Force On Agro-Industries, Box 75, Collection PR, FAO Archives, Rome.

²⁶³ Industry Cooperative Program, "Cooperative Programme of Agro-Allied Industries with FAO and other United Nations Organizations. A presentation to CPC Europe," 03.12.1973, Folder 8, Box 22, Collection SP, FAO Archives, Rome.

²⁶⁴ Chairpersons were E. F. Schroeder of CPC International, 1966–8; Victor Umbricht of Ciba Geigy, 1968–70; Paul Cornelsen of Ralston Purina, 1970–2; J. A. C. Hugill of Tate & Lyle, 1972–4; Luigi Deserti of Oltremare, 1974–6; and George Bishop of Booker McConnell, 1976–8. The Executive Secretary in the 1970s Alexander Gunther Friedrich, a West German forest scientist, summarized his viewpoint on the program and some key information in the book: Alexander Gunther Friedrich and Valence E. Gale, *Public-private partnership within the United Nations system: Now and then* (Bielefeld: W. Bertelsmann Verlag, 2004), 54.

²⁶⁵ Christian Gerlach, "Illusions of Global Governance," 195.

Most corporations providing inputs in the Green Revolution had previously focused on their traditional markets in the Global North. Corporate executives often perceived markets in so-called developing countries to be risky and inaccessible because they depended on an extensive network of support for building up subsidiaries and business relations. In the 1960s, some companies that are worldwide leaders today, such as the chemical company Monsanto, were not even interested in becoming active in so-called developing countries. For them, only those regions that had already experienced a form of agricultural ‘modernization’ were interesting. Monsanto manager Richard Mahoney explained that Monsanto’s strategy for market expansion relied on government agencies to train farmers in the application of new agricultural practices. Without these agencies, Monsanto’s strategy lacked a communication channel to teach farmers about the correct application of their product.²⁶⁶

The FAO had some valuable things to offer multinational corporations that were otherwise difficult to get: contacts and information. Before corporations had established themselves on the markets of so-called developing countries, it was difficult to get in touch with the leading political elites or to get updates about market demands and changes in the agricultural markets. Future demand was difficult to estimate for multinational corporations, because of poor data quality and rapidly changing patterns of demand. Without the data provided by the FAO, it was difficult for corporations to estimate future demands on consumer markets based on their own sources of information. Due to the poor data availability, multinationals often only used their surplus manufacturing capacity to supply developing markets.

It was not only the assessment from the distance that was problematic for companies. They also ran into many difficulties when establishing business on the ground. Charles S. Dennison, the speaker at the Green Revolution symposium, who I quoted in the introduction of this dissertation, stressed the difficulties with which he was confronted, and puffed himself up by

²⁶⁶ Richard J. Mahoney, Monsanto to Walter W. Simons, Deputy Executive Secretary, ICP, “Training, Extension, Research,” 09.24.1976, Folder 44 Agricultural Research, Box 22, Extension And Training, Collection IP, FAO Archives, Rome.

CHAPTER IV

explaining how he confidently handled the expansion of the International Mineral & Chemical Corporation to so-called developing countries:

I have been asked what happens when you run into a backward environment with such a complex operation, and I respond that you lose your religion and your purse. But you do test the system. Each time the international or even the local investor brings in an industrial “engine of change”, he must cope with the local environment, with power supply, with water, with railroad wagons, with harbor facilities, with the total infrastructure support. He also must cope with the available farm credit and the crop offtake system. It is not an easy job.²⁶⁷

For him and other executives, expanding their businesses to such countries turned their work into an adventure and challenge, with many unknown variables and problems: poor infrastructure, complicated bureaucratic procedures, cultural differences, and hostile climatic conditions. The images circulating today of multinational agribusiness corporations as octopus-like invaders do not reflect the typical experiences of corporate executives in the Green Revolution. The enthusiasm for issues and visions of rural development varied greatly among multinational corporations and their executives. The assumption that they operated with superior power in developing countries was not warranted for those responsible executives who expanded business on the ground.

Therefore, to confront the challenges in market expansion, some executives supported an idea of agro-allied development in which industry and public bodies functioned as cooperating institutions. Supporters of agro-allied development understood multinational corporations to have “a long-term interest in being partners in development.”²⁶⁸ This approach was founded on an understanding that industry and agriculture were interdependent so that “neither industry nor agriculture can proceed very far without parallel and balanced development of the other.”²⁶⁹ Many corporate leaders supported the commercial strategy of rural development, such as the

²⁶⁷ Charles S. Dennison, in: US Government Printing Office, “The Green Revolution. Symposium on Science and Foreign Policy,” 117.

²⁶⁸ J. I. Hendrie, “Second Meeting of the Consultative Group on Food Production and Investment in Developing Countries,” 02.23.1976, Folder 69, Box 4, Collection PR, FAO Archives, Rome.

²⁶⁹ M. M. Aref, “The Role of Agro-Industries in the Industrialization of Developing Countries,” undated, Folder FAO Task Force On Agro-Industries, Box 75, Collection PR, FAO Archives, Rome.

Green Revolution approach, focusing on shortening and strengthening “the line from the producer to consumer.”²⁷⁰ In their view, rural areas needed to be better capitalized in terms of easier access to credits for agricultural inputs. Improved capitalization would initiate “the difficult conversion of subsistence farmers to participants in the market economy.”²⁷¹ To allow for this conversion from subsistence farming to a market economy, corporate leaders demanded, firstly, that governments offer financial assistance and low-cost credit to enable farmers to acquire agricultural inputs such as fertilizers; secondly, better schooling to get a “reasonably high level of literacy”²⁷²; and thirdly, investments in infrastructural development in terms of irrigation facilities, storage, and transportation.

In order to solve the problems of long-term planning of production and supply for so-called developing countries, some corporate leaders demanded a stronger role for international organizations to regulate international markets. To this end, they debated an international allocation system for plant protection chemicals.²⁷³ In this system, multinational corporations would have supplied their manufactured goods to a common pool (resembling drafts of a World Food Board, as discussed in the early years of the FAO).²⁷⁴ International organizations would have distributed this pool among so-called developing countries and provided hard currency payment. This proposal could not prevail. Although such a system would have required extensive regulation of trade, some multinationals were in favor of such a system because it would have allowed for long-term supply contracts for agricultural inputs and limited the risks of investment. As an alternative proposal to avoid shortages, Shell’s manager, J. A. Smith, called

²⁷⁰ Eldridge Haynes, “Special Report: Action by Industry to combat the World Food Problem,” 06.16.1966, Folder 9 Working Group on FAO Industry Relations, Box 44, Collection PR, FAO Archives, Rome.

²⁷¹ E. M. Martin, “The Role of the CGFPI,” 11.03.1975, Folder 69 Consultative group on Food Production and Investment in Developing Countries, Box 4, Collection PR, FAO Archives, Rome.

²⁷² Eldridge Haynes, “Special Report: Action by Industry to combat the World Food Problem.”

²⁷³ Industry Cooperative Program, “Emergency Measures in regard to the supply of fertilizers and pesticides,” 07.12.1974, Folder 14 Working group on pesticides 1973 Vol. XIV, Box 22, Collection IP, FAO Archives, Rome.

²⁷⁴ Amy Staples, “To Win the Peace: The Food and Agriculture Organization, Sir John Boyd Orr, and the World Food Board Proposals,” *Peace and Change* 28, No.4 (2003): 495–523.

CHAPTER IV

international agencies to intervene and supply medium and long-term credits at low rates for pesticide purchases.²⁷⁵ The financial resources of the FAO were, however, too limited for such an endeavor, and the proposals did not materialize.

Through the ICP, multinational corporations could access and participate in the debates on rural development in the UN system and profit from its economic intelligence and services. In exchange for these services, the FAO expected systematic technical, financial, and political support from the corporations. Yet, Egon Gleisinger was well aware of the advantages and disadvantages of cooperating with multinational corporations. The FAO had to provide contacts beyond the project level to keep the corporate leaders interested. On the one hand, the FAO was interested in the financial resources of the multinational corporations, as well as their technical and managerial expertise. On the other, it wanted to make sure that by giving them an inch, they would not then take a mile:

[Corporate leaders] want to have the feeling of being actively associated with the work of FAO and that they can keep themselves informed about projects and other activities of interest to them. They also want to feel that their views are being considered in the formulation of our action programs (even though their suggestions and preferences may not be followed). To attend FAO meetings and to have a standing with FAO flatters the pride of even the most important business man.²⁷⁶

Multinational companies favored preferential treatment over collaborative initiatives with other companies. Consequently, the impact of the ICP remained limited.

THE LIMITED IMPACT OF THE ICP

The ICP—as a forum to initiate collaboration between international organizations and among corporations—challenged multinational corporations in their self-understanding. The latter had to engage with the debates of international organizations at the time, but they also had to question how they related to each other. Some executives, such as Andre van Dam, Director of

²⁷⁵ J.A. Smith, “FAO Proposal for Increasing Food Production through improved Plant Protection Programmes,” Folder 14 Working group on pesticides 1973 Vol. XIV, Box 22, Collection IP, FAO Archive, Rome.

²⁷⁶ Egon Gleisinger, “Relations with Industries,” 03.01.1965, Folder FAO Task Force On Agro-Industries, Box 75, Collection PR, FAO Archives, Rome.

Planning CPC Latin America, believed that the severity of the food crises exerted pressure on multinational corporations to assume an additional role in solving some of the world's acute problems. Yet he also stressed that the "rivaling spirit of industry and the proprietary nature of their research would theoretically preclude such a trend."²⁷⁷ While van Dam hoped that the severity of famines would inspire multinational corporations to cooperate to fight hunger, their "rivaling spirit" turned out, indeed, to be a severe obstacle in the efforts of the FAO to engage with multinational corporations as development actors.

On the one hand, most corporations demanded preferential treatment in the establishment of contacts with governments of so-called developing countries, which became more and more difficult for the FAO as the ICP grew in size: the number of members grew from 18 to 99 companies between 1965 and 1974.²⁷⁸ On the other hand, profit-making motives dominated in the execution of rural development projects, and philanthropic or humanitarian motives soon shifted to the background.

The grand words and gestures of corporate executives stood in sharp contrast to their limited commitment to invest financially in rural development. Members made the FAO responsible and claimed that country missions suffered from a lack of agricultural expertise and rarely resulted in profitable outcomes. They complained about a bad information policy—a lack of contacts for information in other UN organizations besides the FAO. The realized projects focused on food processing and the marketing of higher-priced processed foods, and plantation farming. Hence, the program initiated to fight hunger and poverty, especially in rural areas, contributed little to the livelihood of rural communities. Moreover, the FAO never received the financial support of multinational corporations that it had hoped for at the start of the

²⁷⁷ Andre van Dam, "The Coming Crises in Food. A Call for Cooperative Action by Agro-Industrial MNC's," 1974, Folder 8 Industry Cooperative Programme Company File, Box 22, Collection SP, FAO Archives, Rome.

²⁷⁸ Christian Gerlach, "Illusions of Global Governance," 194.

cooperation.²⁷⁹ According to the historian Christian Gerlach, agribusiness corporations used the ICP as a “powerful public relations instrument.”²⁸⁰

Yet, despite the limited impact of the ICP in facilitating cooperation among corporate actors for the initiation of larger rural development strategies, multinational actors collaborated often in the realm of development. On the one hand, in a similar gist, more cooperative bodies with the goal of agricultural development through business initiatives were founded, such as the Agribusiness Council in the United States and the Overseas Agricultural Development Corporation in Japan—in 1967 and 1973, respectively.²⁸¹ On the other hand, companies organized themselves in the consortium approach (such as the Rourkela case and the India Fertilizer consortium)—the initiation of a larger business project with a group of companies (most often of the same nationality) was common practice in the 1950s and 1960s.

When Binay R. Sen initiated the Freedom-from-Hunger campaign in 1960, he had a vision of a broad alliance with a full spectrum of actors, including multinational corporations, in whose technical expertise and financial resources he was interested. By the end of the 1960s, the Industry Cooperative Programme grew in size, but not into the charitable forum, the FAO officials had hoped for. Similarly, for the corporations, too few lucrative projects were realized through the FAO, so corporate leaders redirected their attention elsewhere. US leaders organized themselves in the Agribusiness Council, which was more oriented towards initiating commercially lucrative projects and had a nationally focused agenda, presented in the next section.

CASE II: THE AGRIBUSINESS COUNCIL, INC., (1967- TODAY)

The US American counterpart to the FAO was founded in a political environment in which the collaboration, exchange, and influence of US businesses on development projects was common

²⁷⁹ Ibid.

²⁸⁰ Christian Gerlach, “Illusions of Global Governance,” 197.

²⁸¹ The Overseas Agricultural Development Council was a Japanese venture of 25 agro-industrial firms providing technical help to so-called developing countries. Alan G. Rix, *Japan's Economic Aid: Policy-making and Politics* (London: Routledge, 2011).

practice. Similar to contemporary structures, the US political system of the 1960s provided numerous opportunities for business leaders to influence political decisions. For example, in January 1965, US President Lyndon B. Johnson founded a General Advisory Committee on Foreign Assistance as a forum for advice on and evaluation of foreign aid programs.²⁸² The committee included advisors from businesses, universities, foundations, and former government officials.²⁸³ Around the same time, an Advisory Committee on Private Enterprise in Foreign Aid was founded, followed by conferences which discussed the impact of multinational corporations on agricultural development and the extent to which the US government should attempt to influence and support overseas investments by American business.²⁸⁴

In the late 1960s, the assumed positive impact of multinational corporations on development, and, more specifically, in the ‘fight against hunger,’ provoked an enthusiastic response. Development agencies such as US AID perceived their skills and resources as valuable. This attitude was reflected in the organization of the conference “The World Food Problem: Private Investment and Government Cooperation” in April 1967. The conference aimed to bring together executives of more than 40 corporations, US government and international agencies, foundations, the academic community, and other private organizations, with the aim of examining ways in which business could singly, or jointly with governments, contribute to the

²⁸² J. George Harrar, “General Advisory Committee of President Johnson,” 01.29.1965, Folder 149–54, Box 20, J. George Harrar Papers, Rockefeller Archive Center, Sleepy Hollow, NY.

²⁸³ Members of the General Advisory Committee were James Perkins, Chairman, President of Cornell University; General Alfred Grunther; Mrs. Everett Case; Franklin Murphy, Chancellor, U.C.L.A.; Luther Foster, President Tuskegee Inst.; Arthur Watson, Chairman, ICM World Trade; George Meany, AFL-CIO; Dwayne Andreas, of a Minneapolis grain storage company; J. G. Harrar, President Rockefeller Foundation; William Hewlett, Packard, Palo Alto; Professor Edward Mason, Harvard University; Sol Linowitz, President, Xerox; Eugene Black, former president of the World Bank; John Gardner, Secretary of Health, Education, and Welfare. Unknown, “General Advisory Committee on Foreign Assistance Programs,” 03.12.1965, Folder 169–174, Box 20, J. George Harrar Papers, Rockefeller Archive Center, Sleepy Hollow, NY.

²⁸⁴ Advisory committee on private enterprise in foreign AID, “Foreign Aid through private initiatives,” 02.01.1966, Folder 239-244, Box 20, J. George Harrar Papers, Rockefeller Archive Center, Sleepy Hollow, NY; Advisory committee on private enterprise in foreign AID, “External Assistance to Agriculture in the Developing World,” 02.26.1965, Folder 92, Box 13, J. George Harrar Papers, Rockefeller Archive Center, Sleepy Hollow, NY.

CHAPTER IV

resolution of the world food problem.²⁸⁵ At the conference, an ad hoc committee received the mandate to work toward the implementation of an Agribusiness Council—a council to coordinate private and public efforts to address the international food problems. Henry J. Heinz II, of H. J. Heinz Company, took an outstanding role in the formation process of the Agribusiness Council, and promoted membership in the business community. He saw this council as a framework through which the “moral and intellectual concern of US agribusiness with the problems of world food supply might best be translated into useful activity.”²⁸⁶ Heinz collaborated with well-known business leaders and development policy-makers in the foundation of the Agribusiness Council. For example, William S. Gaud, a US AID administrator, participated in the formation process and spoke at several events. He became famous in the history of development for arguably coining the phrase ‘Green Revolution’ in a speech in March 1968.²⁸⁷

As the development community needed to find a balance in the ratio of public to private involvement in agricultural development strategies, so did business leaders need to find a balance between their philanthropic ideas and profit motives. Heinz, in describing this balance, coined the term “enlightened self-interest” that was also taken up by the later executive director

²⁸⁵ Melvyn H. Bloom, “Agribusiness Council created to Help Meet World Food Shortage,” 11.16.1967, Folder 461, Box 65, Collection Rockefeller Foundation 1.3, Rockefeller Archive Center, Sleepy Hollow, NY.

²⁸⁶ Henry J. Heinz, “Conference on the World Food Problem: Private Investment and Government Cooperation,” 07.28.1967, Folder 461, Box 65, Rockefeller Foundation 1.3, Rockefeller Archive Center, Sleepy Hollow, NY.

²⁸⁷ Other founding members were: R. Hal Dean, President of Ralston Purina Company; Charles Dennison, Overseas Operations of International Minerals and Chemical Corporation; John M. Fox, Chairman of the Board of United Fruit Company; Lowell S. Hardin, Program Officer, Overseas Development Program, Latin America and Caribbean of The Ford Foundation; J. George Harrar, President of The Rockefeller Foundation; David E. Lilienthal, Chairman of the Board of Development and Resources Corporation; W. Robert McLellan, Vice President of FMC International; Professor Don Paarlberg, Department of Agricultural Economics of Purdue University; David Rockefeller, President of Chase Manhattan Bank; Francis X. Scafuro, Senior Vice President of the Bank of America; Clifton R. Wharton, Jr., Vice President of the Agricultural Development Council, Inc.; Sterling Wortman, Director of Agricultural Sciences of The Rockefeller Foundation. Melvyn H. Bloom, “Agribusiness Council created to Help Meet World Food Shortage,” 11.16.1967, Folder 461, Box 65, Collection Rockefeller Foundation 1.3, Rockefeller Archive Center, Sleepy Hollow, NY.

of the Agribusiness Council, George L. Mehren.²⁸⁸ For Heinz, corporate leaders had to fulfill a responsibility of moral leadership in the fight against hunger. This fight required to win public as well as private investments. For him, the degree to which business leaders were willing to take a risk was an indicator of how much responsibility they would take in the search for long-range solutions to the problems of world food sufficiency. However, in his speeches, he always made very clear that these investments needed to be profitable in the long run. The structure and agenda of the Agribusiness Council reflected this attitude.

Serious preparatory discussions of the Agribusiness Council started in spring 1967 after the conference. There was a broad consensus that the Agribusiness Council was to create a forum for agribusiness corporations, designed along the ideas of what business wanted it to be and not along “what the government might like to see.”²⁸⁹ For the council, the aim was to have a close relationship with the government in the whole field of international agricultural development. Its initiators would have liked to see the Agribusiness Council to have a policy recommendation function, in exchange for informal policy suggestions for agribusiness. Unlike the ICP, the Agribusiness Council was a cooperative body for US multinational corporations only and had a national agenda. It aimed to “strengthen the US agricultural sector’s international outreach through stimulating private enterprise trade and investment solutions in Third World agro-industrial development.”²⁹⁰

The Agribusiness Council intended to grow much larger, with a board consisting of 50 corporations funding the council, but with membership places for up to 500 corporations. As a non-profit organization, The Agribusiness Council, Inc. was formally incorporated in Delaware on October 26, 1967. The fifty board members included 41 top executives of corporations in fields such as food production, processing, distribution, farm equipment, agricultural chemicals, and credit and finance as well as nine individuals affiliated with

²⁸⁸ Henry J. Heinz, “A Business Approach to World Food Needs,” 02.06.1968, Folder 462, Box 65, Collection Rockefeller Foundation 1.3, Rockefeller Archive Center, Sleepy Hollow, NY.

²⁸⁹ Agribusiness Council, “Report on Staff Meeting in Washington,” 06.14.1967, Folder 461, Box 65, Collection Rockefeller Foundation 1.3, Rockefeller Archive Center, Sleepy Hollow, NY.

²⁹⁰ Ibid.

CHAPTER IV

foundations, universities, and other non-governmental organizations interested in agricultural development.

Heinz, one of its main initiators, ascribed three core functions to the council: firstly, to make information about the investment climate in so-called developing countries available to encourage investments; secondly, to improve the exchange of information with governments, international organizations, universities, foundations, and other non-profit groups; and thirdly, to act as a referral center in assisting members to locate sources of information.²⁹¹ These three functions suggest that the Agribusiness Council acted based on the maxim ‘business first’ and used the moral concerns of the ‘fight against hunger’ more as a Public Relations (PR) instrument.

The Council was established as a self-supporting, non-profit organization. The Rockefeller Foundation and the Ford Foundation funded the Agribusiness Council partly in its formative years, especially in the first six months. Former employees of the Rockefeller Foundation and the Ford Foundation (such as Haldore Hanson, who organized the Green Revolution campaign for Pakistan), were considered for the position of head of the Agribusiness Council.²⁹² However, in 1968, George L. Mehren, an internationally renowned agricultural economist, became executive director of the Agribusiness Council. He was a familiar face for those who worked on campaigns to improve the world food situation. Mehren worked closely with both US Presidents John F. Kennedy and Lyndon B. Johnson in the development of the Food for Peace program.²⁹³ Under his leadership, the Agribusiness Council organized investment for several countries,

²⁹¹ Melvyn H. Bloom, “Agribusiness Council created to Help Meet World Food Shortage,” 11.16.1967, Folder 461, Box 65, Collection Rockefeller Foundation 1.3, Rockefeller Archive Center, Sleepy Hollow, NY.

²⁹² Sterling Wortman to J. George Harrar, “Tentative Blueprint for an Agribusiness Council,” 07.11.1967, Folder 461, Box 65, Collection Rockefeller Foundation, Rockefeller Archive Center, Sleepy Hollow, NY.

²⁹³ Wolfgang Saxon, “George L. Mehren Is Dead at 79; Ex-Official in Agriculture Dept.,” *New York Times*, July 28, 1992, last accessed 12.30.2020, <https://www.nytimes.com/1992/07/28/us/george-l-mehren-is-dead-at-79-ex-official-in-agriculture-dept.html>.

among them Thailand and Pakistan, collaborating with the Asia Bureau, War on Hunger, US AID, the Rockefeller Foundation, and the Ford Foundation.²⁹⁴

As director of the agricultural division of the Rockefeller Foundation, Sterling Wortman supported the corporations' search for safe and "reasonably profitable" investments. He understood their involvement as a valuable and indispensable asset in agricultural development. In Sterling's view, agricultural development could only be successful if the full Green Revolution package were made available at once:

[...] fertilizers without the pesticides, or pesticides without fertilizers, or manufactured inputs without credit, or any of these without the necessary biological technology are essentially useless.²⁹⁵

Hence, a coordinated supply of all parts of the Green Revolution package was a condition for successful agricultural development. In his view, the Agribusiness Council should create an environment in which all relevant segments of the fertilizer industry, the machinery industry, the pesticide industry, and the credit institutions moved in concert:

From a strictly business standpoint, however, it would seem to be in their own interests that they work together for their common good, which, fortunately, coincides with the needs of humanity.²⁹⁶

However, Wortman continued, coordination among industries would not suffice. Rather, the Agribusiness Council was to work on sound exchange with public agencies as well. In an exchange with George L. Mehren of the Agribusiness Council, Wortman pointed to the successes of public research in plant technology, referencing the rapid transformations in Indian and Pakistani agriculture:

[...] if markets are going to expand as fast as needs develop, then some mechanism must be found to allow industry to move in concert with advances in the public sector. Or, to be more specific, industry should now develop the capability to point out to public

²⁹⁴ George L. Mehren, "Agribusiness Investment Study – Pakistan," 02.13.1969, Folder 544, Box 81, Collection Rockefeller Foundation 1.3, Rockefeller Archive Center, Sleepy Hollow, NY.

²⁹⁵ Sterling Wortman to George L. Mehren, "Rapid Movements in Agriculture," 10.16.1968, Folder 464, Box 65, Collection Rockefeller Foundation 1.3, Rockefeller Archive Center, Sleepy Hollow, NY, 2.

²⁹⁶ Ibid.

agencies the actions, which need to be taken to create viable opportunities for industry to become usefully and profitably involved in meeting world food needs.²⁹⁷

For the “package approach” that the Rockefeller Foundation promoted, the cooperation of the public and private sectors was essential. By supporting the creation of the Agribusiness Council, the officials of the Rockefeller Foundation hoped to increase the interest of agribusiness corporations in investing in the difficult markets of so-called developing countries to secure sufficient supplies of agrichemical inputs. The corporate leaders who organized themselves in the forum were not primarily interested in contributing to solving the world food problem, but rather supposed that the Agribusiness Council served as a platform for valuable contacts with government officials and access to development funds.

CASE III: THE BIMAS GOTONG ROYONG PROJECT IN JAVA, INDONESIA, (1965– 1967)

Henry J. Heinz II, initiator of the Agribusiness Council, was in contact with another spokesperson of multinational corporations in agricultural development—Victor Umbricht, a former Swiss diplomat, who the Swiss chemical corporation Ciba²⁹⁸ employed to represent the interests of the company in international organizations and conferences. While Henry J. Heinz II was particularly active in the Agribusiness Council, Victor Umbricht took a leading role in the ICP and chaired the forum for Ciba, a Swiss chemical corporation, from 1968 to 1970. Umbricht’s contacts and experiences as a formerly high-ranking diplomat should open doors for Ciba in international organizations and development planning. For example, in the late 1960s, Umbricht promoted an aerial spraying project in Indonesia. He screened a promotional video called “Beacon of the Night” at ICP meetings.

Aerial spraying was part of the Bimas Gotong Royong program, also known as the Bimas program of mutual cooperation. For this program, Ciba received a mandate by the Indonesian government to introduce a ‘package’ of products and practices for agricultural modernization,

²⁹⁷ Sterling Wortman to George L. Mehren, “Rapid Movements in Agriculture,” 1.

²⁹⁸ The agrichemical division of Ciba, from 1970 known as Ciba-Geigy, is today an incorporated part of Syngenta, from 2000, and ChemChina, from 2017.

including the large-scale aerial spraying of insecticides, the distribution of high-yielding seed varieties and fertilizers, and a training program for farmers. For the project, the Indonesian government chose 300,000 hectares on mainland Java with the aim to increase rice yields by at least 50 per cent.



Figure 4 CIBA Pilatus Aircraft presented close to a village in Java, Indonesia. Photograph taken by Uwe H. Preuss (Archival Collection Ciba-Geigy)

The video of the corporation begins with Asian stereotypes of exotic Indonesia, of Indonesian shadow puppets and temple dancers accompanied by folkloric flute music. Soon it turns to present the modern technologies introduced through the chemical company, and shows the dramatic change toward “modernity” represented by the aerial spraying and airplanes. Figure 8, above, illustrates this: the “traditional” rural population with their stereotypical sun hats encounter the Swiss “modern” airplane like an alien object.

In the following, I describe the design and execution of this agricultural development project, which exemplifies the close relationship between Suharto, his government, and a multinational corporation in enacting an agricultural development scheme between 1967 and 1969. This

analysis allows for a discussion about why the Indonesian government favored a “public-private-partnership” to increase Indonesia’s food production over other pathways of development.²⁹⁹

THE MOTIVATION OF THE INDONESIAN GOVERNMENT TO COLLABORATE WITH CIBA

The project began after a period of brutal and radical political upheaval in Indonesia. After 22 years of leftist-nationalist rule of President Sukarno, the Indonesian army attempted a Coup d’état in September 1965. General Suharto blamed the communists in the army for the coup and initiated a violent purge against the largest non-governing communist party in the world, which crushed within a year. The mass killings of 1965-1966 caused, according to moderate estimates, at least 500,000 deaths and one million imprisonments. By out-maneuvering left wing Sukarno, Suharto installed an anticommunist army leadership backed by the United States. Suharto’s *New Order Administration* enforced an authoritarian rule with an “extreme intolerance of dissent, broad militarization, [and] a tendency to meet opposition with extreme violence.”³⁰⁰ However, he convinced both Indonesian and international audience that his actions were directed to suppress communist uprisings and received backing for his activities. With Suharto, a phase of economic nationalism ended after decades of anti-imperialist policies, and Indonesia opened for international investments.³⁰¹

This violent upheaval economically ended Sukarno’s ‘anti-imperialist’ policies. Having declared Indonesia’s independence in 1945, Sukarno had been a popular leader of the non-aligned movement, and an advocate of economic nationalist policies. Between 1963 and 1965, Sukarno nationalized foreign corporations and prohibited foreign investments. With declining currency reserves, Indonesia’s economy deteriorated in the early 1960s. President Suharto

²⁹⁹ “Beacon in the Night,” 1969, movie, Archival Collection Ciba-Geigy, Novartis Archives, Basel.

³⁰⁰ Geoffrey Robinson, *The Killing Season: A History of the Indonesian Massacres, 1965–66* (Princeton, NJ: Princeton University Press, 2018), xii.

³⁰¹ Adrian Vickers, *A History of Modern Indonesia*, (Cambridge: Cambridge University Press, 2013); Robinson, *The Killing Season*; Bradley R. Simpson, *Economists with Guns: Authoritarian Development and US-Indonesian relations, 1960-1968* (Stanford, Calif.: Stanford University Press, 2008).

introduced new economic directives and opened the Indonesian economy to foreign investors again. These alignments presented him and his New Order Administration to be committed to industrialization and economic development.³⁰²

However, in the initial post-Sukarno era, Indonesia experienced little economic progress. Furthermore, in the late 1960s, with only slowly increasing food production and rapid population growth, the Indonesian government faced an urgent need to accelerate rural development. Hence, collaboration with Ciba was a good opportunity for the government to recast its development efforts in a new, more positive light.³⁰³ The project aimed to visibly revolutionize agricultural production methods and leave a visible mark in Indonesia's rural countryside. Aircraft were to replace pickaxe and manual labor, and present the cultivators with a new era of progress and modernization.

With the Bimas Gotong Royong, Suharto attempted to find investors for his rural development initiatives. In the promotion video "Beacon of the Night," Suharto explained his motivation for this early form of public-private partnership in 1969:

[...] the government is expanding agricultural production through the BIMAS program that combines mass guidance, better techniques, and materials. Although farmers have their own tools, they do not have enough capital. They cannot afford materials like fertilizer and pesticide. So, private companies like Ciba are helping the farmers. I am confident that the program will succeed. I am also confident that Ciba's cooperation with the farmers and the BIMAS project, a cooperation others will be following—will guarantee the success of the 5-year development plan—the target for rice production under the plan is 15.4 million tons per year by the end of 1973 [...].³⁰⁴

Suharto described in this video the approach of the larger Bimas project that pushed agricultural modernization in Indonesia, in which the cooperation with Ciba played only a small part. He, again, understood the problems of low agricultural productivity to be the result of a lack of capital and access to agricultural technologies. The Indonesian government understood the

³⁰² William A. Redfern, "Sukarno's Guided Democracy and the Takeovers of Foreign Companies in Indonesia in the 1960s" (PhD Diss., University of Michigan, 2010).

³⁰³ Gary E. Hansen, "Indonesia's Green Revolution: The Abandonment of a Non-Market Strategy Toward Change," *Asian Survey* 12, no. 11 (1972): 937.

³⁰⁴ Suharto as quoted and translated in the video "Beacon in the Night".

CHAPTER IV

cooperation with Ciba as an assistance to the farmer to gain access to the materials they supposedly needed to improve agricultural productivity. In that regard, the ideas of the Indonesian government and the ideas expressed in the business fora were very similar: for agricultural development, peasants primarily needed capital and technologies.

Earlier approaches towards rural modernization in Indonesia, such as the village experiments at the Institute of Agriculture in Bogor, showed that the introduction of new technologies required a close cooperation between extension workers and peasants. These experiments started under Sukarno and their success convinced the Indonesian government to turn the short-term university experiments in three villages into a massive national program in the 1960s, known as the Bimas and Inmas programs. On the large scale, the program was no longer capable of emphasizing the personal interaction between innovators and recipients; instead, it turned into a large and bulky government program.

The full package Ciba had to offer appeared to be the answer for Indonesia's rice problem. Struggling with the implementation of large-scale rice improvement schemes, collaborating with Ciba was an opportunity to pass some of the administrative and managerial responsibilities to a third, technologically experienced party. According to agricultural scientist, Gary E. Hansen, this approach reflected a "lack of confidence in the peasant's capacity to perform his role as a rational decision maker."³⁰⁵ By collaborating with a corporate actor, the Indonesian government sought support for its extension work, which was highly understaffed, and replaced farmers' training in new practices with a large-scale application program. In this way, the government relied on external sources of assistance to compensate for its administrative shortcomings and consequent poor performance in terms of agricultural modernization.

The project lined up in a sequence of attempts to spread input-oriented cultivation practices that required the reliable delivery of agricultural inputs. Hitherto, limited foreign currency resources and price fluctuations hindered the collaboration with multinational companies. The direct line to the producers of agrichemical supplies and their provision of credits could overcome these

³⁰⁵ Hansen, "Indonesia's Green Revolution," 934–935.

problems. Furthermore, in this direct mode of cooperation (unlike the cooperation with development projects of the FAO), Ciba was willing to provide capital and to find funding resources from Swiss banks. Ciba and other participating companies provided short-term credits to the government and guaranteed stable prices for the agricultural inputs

Indonesian officials were confident of the value of external assistance and contracted a variety of firms, such as, and in particular, Ciba (Switzerland), Hoechst (West Germany), A.H.T. (West Germany), and Mitsubishi (Japan).³⁰⁶ Ciba was the company with the highest investments and largest responsibilities in the course of the project.

CIBA'S IDEA OF THE BIMAS GOTONG ROYONG PROJECT

Ciba saw the Bimas Gotong Royong scheme primarily as an opportunity to sell its products in bulk; changing farmers' practices through an extension and training program was a secondary concern. Distributing its products in remote areas with weak infrastructure without the collaboration of Suharto's public institutions was a difficult-to-overcome challenge for the corporation. By offering a full package Kurt Rohner, Chairman of Ciba's management committee, hoped to find access to the Indonesian market for agricultural supplies:

We are a latecomer in this business. For us, the total approach— as we are demonstrating in Indonesia right now – is the key. Such a project is costly and complicated, and not easily implemented, but it is feasible. These people in the developing countries need and welcome the technical advice and on-the-spot assistance, which CIBA has to offer and which make a project of this kind attractive. We are a commercial enterprise, not the Red Cross or AID; but if we can combine our efforts and help each other, the approach is ideal. We have much to gain and very little to lose.³⁰⁷

Kurt Rohner stressed Ciba's self-understanding as a "commercial enterprise" and not a humanitarian or development actor such as "Red Cross or AID." Nonetheless, despite being a profit-seeking actor, Ciba was convinced that it could make a helpful contribution with its technologies to Indonesian agricultural development. It trusted that the aerial spraying technology could overcome problems that plagued earlier agricultural approaches, which were

³⁰⁶ Hansen, "Indonesia's Green Revolution," 937.

³⁰⁷ Farm Chemicals, "Dr. Kurt Rohner Tells How CIBA'S Total Approach Builds Pesticide Sales," April 1969, Vf.12.01.5, Collection Firmenarchiv of Ciba-Geigy, Novartis Archive, Basel.

CHAPTER IV

often fragmented, slow, and ineffective in their extension work. With this trust in their technologies, he presented confidently his company although acknowledging that it was a latecomer in the agrochemical field. He saw Ciba's biggest sale potential internationally, in so-called developing countries, where it could combine the sale of its products with the sale of a complete application service.

By 1969, Ciba had already expanded its activities to 55 countries via agents or affiliates, had built facilities in eleven countries and research stations in Switzerland, the United States, and India. Josef Meierhans, Ciba's head of worldwide promotion and sales, explained:

We are convinced that there is a need to offer not simply a good range of pesticides, but an entire pest control program for particular crops. It should be possible for an important customer—a government, for example, to hand over to a pest control firm the entire responsibility for taking care of a particular crop in a broad area. If you only sell the pesticide, either it is applied in a wrong way at the wrong time, or it lies in a warehouse because the farmer doesn't know how to apply it and does not have the necessary equipment.³⁰⁸

In this quote, Meierhans stressed his preference for centralized planning in agriculture and argued that his corporation could better fulfill the responsibility for the correct application of pesticides than the farmer himself could. In that regard, much of Ciba's approach resembled ideas of plantation farming, where a manager coordinates workers on the farm. Similarly, Ciba understood itself as an agent managing and coordinating farmers' activities in the adoption of the "full package" of agricultural modernization. Ciba's managers were to instruct the cultivator about the timing in the plantation cycle, as well as the correct application of fertilizers and pesticides.

The Bimas project in Indonesia was Ciba's first full-scale project in the field of aerial spraying. It combined the sale of insecticides with the supply of fertilizers and the responsibility for pest control on 300,000 hectares of rice. The project took place in a well-irrigated area of Indonesia, in densely populated Java, where the average farm family owned 0.3 hectares of farmland.³⁰⁹ While Ciba did not have to pay taxes, it had to pay a sum of four million rupiah as a management

³⁰⁸ Ibid.

³⁰⁹ Hansen, "Indonesia's Green Revolution," 934.

fee, with respect to each area of 100,000 hectares to be treated.³¹⁰ Under the terms of the contract, Ciba's entomologists set up traps to observe the build-up of the rice stem borer moth population and applied pesticides as needed. The company and the Indonesian government agreed that 19.25 million liters of the insecticide Dimecron 100 had to be sprayed four times during the wet season from December through April.³¹¹ Pilatus Turbo Porter spray planes were used for this purpose, equipped for waterless spraying and guided by a mobile Decca navigation system. This method enabled the pilot to lay down his spray path with an accuracy of one meter, without the aid of ground markings.³¹²

High investments characterized Ciba's expansion to so-called developing countries: for the Bimas Gotong Royong, Ciba had to create a new company—CIBA-Pilatus Aerial Spraying. Primarily founded for aerial spraying projects in so-called developing countries, CIBA-Pilatus developed more broadly into a vehicle for research and the promotion of better application techniques and aimed to strengthen Ciba's market position for agrochemicals worldwide. The general goal of the company was to provide a promotional service to the Marketing Departments of the agrochemical division, in order to obtain larger sales of agrochemicals and enhance Ciba's technical prestige. Hence, it was important to Ciba to maintain a high standard of operations and

³¹⁰ Ciba-Pilatus, "Charter Agreement for the Use of Aerial Spraying in Indonesia," 05.24.1968, Folder ZF Recht, Rechtsberatung Division Agrarchemie CIBA-PILATUS Aerial Spraying Company Ltd., Glarus (ab 1980 Stans), Charter agreements: Projekte, Länder/ Firmen A-L, RE 4.3, Collection Ciba-Geigy, Novartis Archive, Basel.

³¹¹ The company sprayed Dimecron and to a lesser extent, Novacron—systemic insecticides, effective against the rice stem borer moths and the fast destroying "Army Worm", as employees called it. According to a former employee, Dimecron and Novacron were not toxic to fish as the Hoechst product was. A positive "side effect," according to verbal information at the time, was that the *Anopheles* mosquito population decreased and with it the prevalence of malaria. Oral report of former employee Uwe Preuss.

³¹² Ciba, "Notiz zu Händen von Herrn Prof. Dr. M. Staehelin im Hinblick auf den bevorstehenden Besuch von Präsident Suharto (AC 6.73/SS/HO)," 11.15.1972, Folder Regionsdienste: Indonesien, Korrespondenz, Protokolle, Berichte, Divisionen, Funktionen 1973-1976, RD 9.1.02, Archival Collection Ciba-Geigy, Novartis Archive, Basel.

a consistent reputation. Furthermore, Ciba Pilatus was to obtain scientific data and develop new spraying methods.³¹³ Its machinery is illustrated in figure 9.

THE VISUAL LANGUAGE OF THE CIBA BIMAS PROJECT

The Ciba Bimas project promoted the use of rice varieties developed by the International Rice Research Institute (IRRI) in the Philippines. The Rockefeller Foundation and Ford Foundation founded the IRRI in 1960, in cooperation with the government of the Philippines. The research institute released its first variety on a large-scale, named IR-8, in 1966. Although the variety was very new, and had to prove itself, the Indonesian government decided to use it on a large scale in the Bimas project in Indonesia only a year later, despite different geographical and climatic conditions. This might have been the case because, as historian Nick Cullather argues, the new variety IR-8 spoke its own language—the language of modernization. Traditional Indonesian varieties had a much longer stalk so that the new variety appeared to be a dwarf. IR-8 as a semi-dwarf “rugged variety that could go almost anywhere,”³¹⁴ with its short stalks made the transformation from old to new practices visible in the rural landscape.

The use of airplanes reinforced this visual language. The airplanes looked at local peculiarities from a distance and regardless of the conditions, sprayed over them in standardized procedures. The picture below allows us to understand these changes. The airplane flies high above the rice fields that are barely distinguishable. For the pilot, it does not matter if he crossed the borders of fields, little rivers or a small village—the method of application stays the same.

While IR-8 changed the visual landscapes due to its size and diffusion over large plots of land, the airplanes appeared as foreign objects over the fields of Java. Java’s rice farming traditionally used high levels of manual labor to which the automated application of chemical insecticides

³¹³ CIBA-Pilatus Aerial Spraying Company AG, “5-Jahresplan für die Periode 1972–1976,” Folder ZF Recht, Rechtsberatung: Division Agrarchemie CIBA-PILATUS Aerial Spraying Company Ltd., Glarus (ab 1980 Stans), Generalversammlung, Verwaltungsrat: Unterlagen, Vollmachten, Konferenzberichte 1967-72, RE 4.3, Collection CIBA-GEIGY, Novartis Archive, Basel.

³¹⁴ International Rice Research Institute, *IR8 and beyond* (Los Baños: International Rice Research Institute, 1977).

stood in sharp contrast. While the airplanes might have provoked images of modernization and a future of economic progress and wealth for Indonesian farmers and political elites, aerial spraying also reduced the autonomy of farmers, compared to traditional rice growing practices. The Indonesian government struggled in its earlier approaches to agricultural modernization with reaching farmers in the villages due to a lack of trained personal. With aerial application of chemical inputs, the modernization depended apparently less on the initiative and skills of peasants and put the responsibility of ‘modernization’ in the hands of the corporation. However, Ciba encountered serious difficulties in making sure that farmers planted the seeds and applied fertilizers at the projected time and in the correct amounts to make sure that the application of insecticides would be effective. Hence, the same difficulties of reaching farmers as in earlier programs hindered aerial application.³¹⁵

Instead of developing practices that adapted to local contexts, the corporation chose to develop a standardized ideotype of rice farming that, similar to the IR-8 variety, was applicable to a diversity of local contexts as a universal model for the application of plant protection chemicals. The use of large-scale agricultural development schemes to sell its agrichemicals in bulk appeared to be an innovative and profitable approach to expanding the market for agrichemicals to so-called developing countries. Green Revolution technologies showed a recurrent pattern of promoting universal agricultural practices. This pattern resulted from an ideal of agricultural modernization that looked and worked alike in a multitude of environmental and social contexts, following a ‘modernist’ philosophy that nullified place.

By centralizing the management of agricultural activities, designers of the Ciba Bimas project put their fingers on the pulse of the time. When the Thai and Philippine governments approached Ciba to submit plans for similar projects, its employees recognized a trend in large-scale projects to solve the food problems. Therefore, in 1969, Ciba sent similar plans to the respective governments of Thailand, the Philippines, and Burma.³¹⁶ Rohner explained: “Such package

³¹⁵ Hansen, “Indonesia’s Green Revolution,” 936.

³¹⁶ CIBA- Pilatus Aerial Spraying Company AG, “Protokoll des 5. Verwaltungsrates der CIBA- Pilatus Aerial Spraying Company AG,” 11.07.1968, Folder Rechtsberatung: Division Agrarchemie, CIBA-

CHAPTER IV

deals are particularly attractive to developing countries which urgently need to increase food production, but do not yet have the means to carry out such large-scale crop protection operations.”³¹⁷

BIMAS GOTONG ROYONG AND THE AUTONOMY OF THE PEASANTS

Aerial spraying added an element of coercion to agricultural modernization during the Green Revolution in Indonesia. The plots of land had to be directly adjacent to one another to be suitable for aerial spraying. Therefore, airplanes did not skip singular small plots of land and the sprayings took place with or without consent of the farmers. As a result, the government forced peasants to participate in the program. The Indonesian government agreed to give Ciba all possible assistance to facilitate the carrying out of its obligations, particularly, in connection with the importation and internal transportation of the materials and equipment necessary for the program.

For the transportation of the material, the Indonesian army supported Ciba, as illustrated below, in figure 11. A young man, wearing a uniform and holding a gun, sits on bags in the back of a truck full of fertilizers. Apparently, he aims to protect the expensive deliveries. The photo gives an impression of how the development scheme was enforced: under the threat of the use of force. Ciba had to reimburse the government for these security services through a management fee as explained above. However, the transport of fertilizer to the villages was problematic. The military had to disseminate around 60,000 tons of fertilizer by trains, trucks, and oxcarts. In interviews with university teams, peasants soon complained about late deliveries and reported about the suspicion of corrupt government officials.³¹⁸

PILATUS Aerial Spraying Company Ltd., Glarus (ab 1980 Stans) Generalversammlung, Verwaltungsrat: Protokolle, Berichte, Aktennotizen, RE 4.3, Collection Ciba-Geigy, Novartis Archive, Basel.

³¹⁷ Farm Chemicals, “Dr. Kurt Rohner Tells How CIBA’S Total Approach Builds Pesticide Sales,” April 1969, Vf.12.01.5, Collection of Ciba-Geigy, Novartis Archive, Basel.

³¹⁸ Hansen, “Indonesia’s Green Revolution,” 932–933, 940; Ciba Journal, “CIBA Executed Project Doubled Rice Yield in Java, Ciba Journal, Summer 1969, No. 50,” Vf.12.05.1, Collection Ciba-Geigy, Novartis Archive, Basel.



Figure 5 CIBA Pilatus Porter flying over the fields of Java/ spraying aperture (undated).
Photograph taken by Uwe H. Preuss (Archival Collection of Ciba-Geigy)

Although the government introduced the BIMAS program as an effort to assist the peasant and to improve his livelihood, a research team of the University of Padjadjaran observed a return to the Dutch Culture System “cultuurstelsel,” a form of enforcement planting with the officialdom authoritatively coercing the peasant to comply with government instructions.³¹⁹ In the earlier approaches to agricultural modernization, the Indonesian government experienced that peasants only paid back credits to a limited extent. Therefore, the government decided for a new approach to collecting debt. It demanded repayments equal to one sixth of the farmer’s harvest. In figure 10 below, the corporate employees in the back of the photo present themselves attentively observing the correctness of measurements.

At first glance, this appeared to be advantageous to both sides: repayments were not an absolute amount and therefore more in accordance with the peasant’s capability to pay. Based on the data

³¹⁹ Hansen, “Indonesia’s Green Revolution,” 943.

available from Ciba's experimental fields, the Indonesian government expected a growth in production of more than 50 per cent, so that it expected to cover the expenses for the agricultural inputs paid to Ciba easily. However, this method of payment offered a door for the peasants to not comply with the terms of payment. Ciba's employees observed that it was profitable for Indonesian farmers to submit inaccurate reports of actual yield in order to reduce their amount of payment. Although the Indonesian government tried to install mechanisms of control over actual amount of yields, farmers could bypass these mechanisms by selling the fertilizer distributed to them through government channels to other farmers.

Beyond the problems of inaccurate measurement, the project encountered a broad variety of problems linked to large-scale logistical complexities. Ciba's pilots argued that they kept the schedule, but peasants varied in their planting period. Hence, the coordination between Ciba and the farmer did not work out as projected, so that Ciba applied the spraying frequently at the wrong time. Therefore, the project could only have a small impact on pest control.³²⁰

OUTCOME OF THE CIBA BIMAS GOTONG ROYONG

The low repayment rates of the project turned it into a great failure for the Indonesian government. By 1969, repayment rates fell from 34 per cent to 90 per cent of the projected rate of collection. These low rates of collection indicated that management, technologies, and the collection were not successful. For the whole country, in March 1970, the Indonesian Ministry of Agriculture published a report that yields of IR-5 and IR-8 achieved only 65.7 per cent of their target. Consequently, May 20, 1970, President Suharto abandoned the Ciba Bimas Gotong Royong program. At this point, the government had lost approximately 10 billion rupiah for its post-1968 rice campaigns. For Ciba, the end of the project came unexpectedly. It was only in February of 1970 that Ciba realized that the Indonesian government was inclining towards phasing out its Ciba commitments. The first contract with the Indonesian government projected

³²⁰ Hansen, "Indonesia's Green Revolution," 932–933, 940; Ciba Journal, "CIBA Executed Project Doubled Rice Yield in Java, Ciba Journal, Summer 1969, No. 50, , Vf.12.05.1, Collection Ciba-Geigy, Novartis Archives, Basel.

a planning period of five years. With the shorter contract period, Ciba was concerned about failed investments in hangars, workshops, airstrips, and staff commitments.³²¹



Figure 6 Government officials weigh rice bushels. Ciba employees observe the process from the background. Photograph taken by Uwe H. Preuss (Archival Collection of Ciba-Geigy)

³²¹ Ciba, “Notiz zu Händen von Herrn Prof. Dr. M. Staehelin im Hinblick auf den bevorstehenden Besuch von Präsident Suharto (AC 6.73/SS/HO),” 11.15.1972, Folder Regionsdienste: Indonesien, Korrespondenz, Protokolle, Berichte, Divisionen, Funktionen 1973-1976, RD 9.1.02, Collection Ciba-Geigy, Novartis Archive, Basel; Hansen, “Indonesia’s Green Revolution,” 932, 942–944.



Figure 7 Military protecting the delivery of fertilizers to the villages. Photograph taken by Uwe H. Preuss (Archival Collection of Ciba-Geigy)

Yet Ciba continued to present the project as a resounding success in terms of productivity increases, and held the Indonesian government responsible for the termination of the project. Ciba's employees argued that the Indonesian government had only ended the project because aerial spraying provided fewer opportunities for government officials to personally benefit on the local level; they could not sell the chemical input to the farmer. Farmers, who paid for the operation, felt that they obtained little in return—only an aircraft from time to time flying high over their fields. Farmers had no physical evidence of any benefit, as it was not within their responsibility to apply the insecticide directly.³²²

³²² R.J.V. Joyce and L.C. Marmol, "Report on visit to Indonesia 3-14 February 1970, A plan for maintaining CIBA'S position in Indonesia," Folder ZF RECHT Rechtsberatung: Division Agrarchemie CIBA-PILATUS Aerial Spraying Company Ltd., Glarus (ab 1980 Stans), Generalversammlung, Verwaltungsrat, Unterlagen, Vollmachten, Konferenzberichte 1967-72, RE 4.3, Collection CIBA-GEIGY, Novartis Archive, Basel.

Corruption on several levels contributed to the technical failure of the project: bureaucratic elites varied in their commitment to the project and were able to embezzle assets for their personal enrichment in the distribution of agricultural inputs. Other competitors, especially from Japan, accessed the market for plant protection with hand applicators via soft credits provided by Japanese development funds. These companies benefited from the training executed through Ciba in the Bimas Gotong Royong project. This replacement of Ciba as the leading company for insecticides followed a recurrent pattern. It was often not very lucrative for multinational corporations to invest in long-term training programs or to introduce agricultural intensification technologies to a new market. While investment costs were high for first entrants to the market, market entry was easier for competing companies who arrived at a later stage because the training costs were lower for them. While Ciba-Geigy invested much in educating farmers in the proper use of agricultural inputs, it was easier for a Japanese firm to make a cheaper offer based on the distribution of by-hand applicators for pesticides following Ciba-Geigy's training program. Moreover, it cannot be ruled out that the possibility for personal enrichment with the distribution of insecticides for hand applicators affected the government's decision to decide against aerial spraying.

Yet Ciba enjoyed side benefits of being involved in the program: by improving the relations to the Indonesian government, it was easier for Ciba to establish production capacities for its pharmaceutical production. Therefore, even if the Bimas project was less profitable than expected, the company achieved long-term profitability.³²³

ASSESSMENT OF THE BIMAS GOTONG ROYONG

Regardless of the problems related to the management of the project, a variety of problems occurred in the aftermath of the project in relation to the Green Revolution seed IR-8. As IR-8 was a variety bred in the climatic condition of the Philippines, its application in Indonesia was by far more problematic. Grown in Indonesia, IR-8 was very vulnerable to certain Indonesian

³²³ Alexis Rieffel, "The BIMAS Program for Self-Sufficiency in Rice Production," *Indonesia* 8 (1969): 103–33.

CHAPTER IV

pests. Moreover, IR-8 did not rate high in consumer tastes. As a result, after the project, peasants shifted back to the use of conventional seeds that required a lower dose of fertilizer.

The public, at least in the Global North, was well aware of the possible environment and health damaging effects of aerial application from the early 1960s. However, neither the Indonesian government nor Ciba addressed these problems in the course of the negotiations. While reports of harmful effects on fish populations appeared soon after the start of the BIMAS project, as a point, these issues were not part of debate in the internal meetings of the company nor in the negotiations with the government. However, Ciba Pilatus had an insurance contract with Winterthur, a Swiss insurance company, for cases of damage linked to the aerial application of insecticides and pesticides, with a coverage of SFr 1 million per case. In October 1968, the company extended coverage to people working on the fields. While I could not find discussions of the health risks of aerial application in agriculture, these insurance contracts showed that Ciba's managers had an awareness of the risks connected to their method of application.³²⁴ Nonetheless, the environmental and health risks were not the reason to end the project; rather, it was the limits of large-scale agricultural planning and the low returns of the project.

The images of airplanes (such as the one above showing the fields of Java through the windows of an airplane) evoke the notion of development from above. These airplanes appeared to be an effective means to avoid time-consuming training activities and interaction with the difficult-to-be-reached farming population. From above, the Indonesian government decided to hand the application of pesticides over to a single experienced actor, a multinational corporation. Yet, from above, the corporation only had control over a single step in the cultivation process, the application of insecticides, and did not have the means to coordinate all farming activities necessary for a successful cultivation. Despite the failure of the project, it allowed Ciba to

³²⁴ Winterthur Versicherung, "Brief an die Herren des Verwaltungsrates der CIBA-Pilatus Aerial Spraying Company Ltd.," 07.02.1969, Folder ZF Recht Rechtsberatung Agrarchemie CIBA-PILATUS Aerial Spraying Company CO. AG, Versicherungsfragen, March 1968-July 1976, RE 4, collection Ciba-Geigy, Novartis Archive, Basel.

establish a corporate image of being a “responsible”³²⁵ and “good” corporation—an image Ciba used in the early 1970s to have an impact on the regulation of pesticides within the FAO.

In 1971, Ciba-Geigy offered to lease out specialists to work on legislative aspects of the application of pesticides. Offering their own employees to consult and work for the FAO was meant to make the registration processes of its plant protection chemicals in different countries easier, and was an opportunity to enforce less restrictive and more liberal importation policies for its products.³²⁶ Ciba-Geigy, the Swiss chemical corporation, saw an opportunity to influence the FAO’s plant protection policies in a way that created a favorable investment climate in so-called developing countries in the early 1970s. To achieve this end, Ciba-Geigy expressed an awareness of its “obligation to assist developing countries” stressing its “immense research investments and many years of world-wide experience in developing countries.”³²⁷

Ciba’s preference for cooperating with public actors was of course not exceptional. Although, for some companies, cooperation with government authorities was difficult because of a “traditional distaste for government direction,”³²⁸ other corporations were interested in collaborative projects, but only if a close cooperation with the local government, the FAO, or other institutions was possible.³²⁹ As observed in chapters II and III, multinational corporations were very demanding of financial support from their home governments to invest in developing

³²⁵ Ciba-Geigy to G. Knapton, “UNIDO Workshop on Pesticides—Draft Conclusion and Recommendations,” 09.23.1973, Folder Working group on pesticides 1973 Vol. X, Box 14, Collection IP 22, FAO Archives, Rome.

³²⁶ E. Usteri and W. Büttiker to Industry Cooperative Programme, “Correspondence,” 02.26.1971, Folder Industry Cooperative Programme Company File Ciba-Geigy, Box 8, Collection SP 22, FAO Archives, Rome.

³²⁷ Ciba-Geigy to G. Knapton, “UNIDO Workshop on Pesticides—Draft Conclusion and Recommendations,” 09.23.1973, Folder Working group on pesticides 1973, Vol. X, Box 14, Collection IP 22, FAO Archives, Rome.

³²⁸ Eldridge Haynes, “Special Report: Action by Industry to combat the World Food Problem,” 06.16.1966, Folder 9 Working Group on FAO Industry Relations, Box 44, Collection PR, FAO Archives, Rome.

³²⁹ Redlhammer, Hoechst to Alexander G. Friedrich, FAO, “Research, Extension and Training,” 06.18.1975, Folder 44 Agricultural Research, Extension and Training, Box 22, Collection IP, FAO Archives, Rome.

countries. Furthermore, in expanding their business activities to remote areas with weak market structures, they relied on the destination governments' infrastructure and institutions to make the marketing and distribution of products easier. Hence, it would appear to be shortsighted to assume that all multinational corporations were likely to refuse collaboration with governments; rather, they attempted to profit from the public institutions already in place.

CONCLUSION

This chapter looked at institutions and projects that allowed multinational corporations to become proactive partners of governments and international organizations in rural development efforts. It stressed that corporations did not aim to act on their own, but attempted to cooperate as well with public institutions as other corporations. On the international level, the Industry Cooperative Programme, initiated in 1965 under the umbrella of the FAO, was an attempt to take multinational corporations on board to solve global rural development problems by increasing agricultural productivity. In this initiative, the FAO understood business actors to be specialists in the production and marketing of the inputs needed for agricultural modernization. With very limited financial resources to hand, the FAO wanted to gain influence in rural development policy-making by profiting from the financial and managerial means of multinational corporations. However, multinational corporations were merely interested in profiting from the contacts and information the FAO provided, and were very hesitant to commit their resources to their development projects.

On a national level, the Agribusiness Council, on the other hand, had clear commercial targets for its company members. It provided its members with the contacts of US AID officials and leading diplomats that could help with investment projects. The philanthropic Rockefeller Foundation and Ford Foundation funded its establishment, to support collaboration between development agencies and multinational corporations, in order to secure the supply of agricultural inputs. Its administrators believed in multinational corporations as essential partners of agricultural development efforts during the Green Revolution.

In some cases, multinational corporations also cooperated directly with governments in so-called developing countries. The Bimas Gotong Royong is an example of such a public-private-partnership, long before the term became *en vogue* in the course of the 1990s. In its early stages,

in the context of the Industry Cooperative Programme, Ciba presented this project to other corporate leaders as an ideotype for cooperation between a government of a so-called developing country and a corporation. However, the close collaboration of the Swiss corporation with the Indonesian leader, Suharto, was criticized by human rights organizations after Suharto's military coup and the mass killings in 1965 and 1966.³³⁰

For Suharto, the cooperation with Ciba was an opportunity to pass some of the administrative and managerial responsibilities into the hands of a third, technologically experienced party. Ciba was certain that in developing countries the use of aircraft would increase productivity and achieve recognition as an effective means to treat large crop areas. Yet the management of complex large-scale projects demanded a high level of regulation and control—one that could apparently be guaranteed by the authoritarian Suharto regime, its military, and its coercive measures. The collaboration with a strict bureaucracy made it apparently easier to expand to the Indonesian market and attractive to invest. Thinking in terms of technocratic ideals, which favored economic progress, Suharto's regime appeared to be the ideal partner to spread technologies with the primary focus on increasing productivity. However, as in many large-scale development schemes of the time, experiences made on a small scale were not repeatable on a larger scale. It was difficult to manage the farming activities of the multitude of peasants, who often resisted the regulation and control of the executors of the project.

This chapter suggests that we understand the Green Revolution's approach to rural development as a 'package' approach—a package in which all parts were mutually dependent. The Green Revolution was more than a mere set of changes in agricultural economic practice – not only did it have severe social and environmental consequences, but it also required rural development actors to depend on each other. As Sterling Wortman, the head of the Agricultural division of the Rockefeller Foundation, stressed, the use of high-yielding varieties was dependent on fertilizer. Their usage entailed the use of pesticides. All these inputs increased the farmers' demand for capital and credits. In order to provide the full package of agricultural supplies, a

³³⁰ Amnesty International to Ciba-Geigy, "Indonesien," 05.30.1978, Regionsdienste, Indonesien 1977-1982, RD 9.1.02, Collection Ciba-Geigy, Novaris Archive, Basel.

CHAPTER IV

broad array of actors – including international organizations, governments, and multinational corporations – had to collaborate. Multinational corporations provided the technical supplies for the requisite agricultural reforms; the foundation of the ICP and the Agribusiness Council allowed for a better communication among the suppliers.

The case of the Bimas Gotong Royong shows that governments were often constrained by limited budgets, and found multinational corporations to be a valuable source of capital and technology—both needed for the envisioned agricultural transformation of the ‘Green Revolution approach’. The FAO as an international organization had the means to connect multinational corporations with these governments of so-called developing countries.

This collaboration in the name of agricultural ‘modernization’ was designed to be advantageous and profitable for many actors involved in rural development—the farmers were to profit through improvements in their agricultural productivity; the governments were to improve levels of food sufficiency and thereby enhance their political legitimacy; and the corporations would enjoy rising demand for their agricultural supplies. However, problems soon arose in the cooperation among corporations, governments, and international organizations. The companies were not willing to take larger financial risks and did not make any sacrifices concerning the profitability of their companies. This limited perspective of corporate leaders on rural development as a profit-making endeavor made them difficult partners in rural development. Although technology-driven rural development strategies demanded their expertise and products, with their focus on profitability, they relegated other dimensions of rural development—such as education, health, and the environment—to the background. Secondly, and consequently, multinationals were dependent on collaboration with governmental actors to fund the marketization of rural areas in terms of infrastructure, education and credit supply, while demanding government authorities and development agencies back their investments in the expansion of business activities.

CHAPTER V

GAINING INFLUENCE FROM THE GREEN TO THE GENE REVOLUTION IN THE 1970S

Looking at the role of multinational corporations in rural development in the 1970s opens a window to a paradoxical development: on one hand, the historical context of the 1970s favored a critical confrontation with multinational companies: environmentalist, leftist, and anti-globalization critics began to scrutinize the behavior of multinational companies. Especially the environmentalist critique resulted in numerous national and international regulatory regimes, e.g. concerning pesticide usage. Furthermore, governments of so-called developing countries organized themselves through geopolitical initiatives, such as the New International Economic Order (NIEO) in the United Nations, in 1973, to enforce regulatory regimes pertaining to the activities of multinational companies and to improve their position in the global economy vis-à-vis their former colonizers. On the other hand, multinational corporations gained strength in the course of the 1970s when the trust in the state as the central organizing unit eroded. By the 1980s, with the Washington consensus,³³¹ the belief that multinational corporations were more effective and innovative rural development actors than state-led institutions became hegemonic in the international development community.

This chapter scrutinizes how these apparently opposing trends influenced each other. I argue that the confrontational environment of the 1970s created incentives for multinational chemical corporations to change their course by investing and expanding into other business fields, such as biotechnology. Biotechnological discoveries and new regimes of intellectual property rights with respect to plants and their parts encouraged private investments and strengthened the position of private agricultural research vis-à-vis public institutions in the long-term. This

³³¹ The Washington consensus was a set of economic policy recommendations for so-called developing countries, and Latin America in particular, that became popular during the 1980s as a directive of US foreign policy-making. John Williamson, "A Short History of the Washington Consensus," *Law and Business Review for the Americas* 15, no. 1 (2009): 7-23.

CHAPTER V

chapter describes this transition from the Green Revolution, based on publicly- and philanthropically-funded research initiatives, to the so-called Gene Revolution. The Gene Revolution mainly took place in the 1980s and was the result of private research initiatives of multinational corporations.

The “stagflation” crisis of the 1970s severely constrained the budgets and policies policy-making regimes of governments and international organizations. The economic downturn in the aftermath of the oil price shock of 1973 led to a decrease in public budgets and an increasing support of the idea of the privatization of state-owned enterprises. Internationally, the economic turndown was a harbinger of the debt crisis of the 1980s, in which so-called developing countries were no longer able to service large loans granted to them in the course of the 1960s and 1970s. Hence, the 1970s marked the beginning of the breakdown of the postwar Keynesian consensus, which promoted state-interventionist economic policies. In the 1980s, development institutions such as the World Bank and the International Monetary Fund developed a package of economic policy prescriptions to react to the debt crisis in Latin America. This so-called Washington consensus advocated the expansion of market forces within all parts of the domestic economy and gave a special role to private actors. Neoliberal policies including the privatization of state enterprises became common practice.

In the first part of this chapter, I discuss the various roots of criticism of corporations in the 1970s and set them in relation to the criticisms of the Green Revolution. In the course of the 1960s, multinational corporations had expanded their business activities rapidly across the globe and their economic and political influence on the international economy increased. In the course of the 1970s, political scientists and economists criticized their role and impact because they feared a loss of nation-state sovereignty in the context of fast-paced economic globalization—increases in international trade, foreign direct investment, and international migration.

As the manufacturers and principal advocates of agrichemicals, multinational corporations were an integral part of environmentalist debates and used their influence to lobby against agrichemical regulation from the 1960s onwards. In the 1970s, the concerns of the environmental movement increasingly expanded beyond national borders. The usage of defoliants such as Agent Orange and the environmental damage and potential health hazards arising during the Vietnam War triggered a wave of scientific, environmentalist, and anti-war

criticism on a global scale. The debates around Agent Orange united the anti-war movement with the environmentalist movement. In what was referred to as a 'military-industrial complex,' the movement highlighted the close collaboration of multinational corporations with the government in the United States. In addition to their protest against US involvement in the Vietnam War and its many civilian victims, predominantly leftist critics also scrutinized the role of multinational corporations in the foreign policy of Presidents John F. Kennedy and Lyndon B. Johnson, in general. Their criticism targeted the use of foreign aid as a diplomatic tool and a tool for US business promotion abroad.

In the second section, I describe the reactions and strategies of multinational corporations in this increasingly confrontational environment. Firstly, I analyze their responses with the established lobby instruments that I introduced in chapter 4. Especially through the Food and Agriculture Organization (FAO), multinational corporations found ways to voice their concerns about strict regulatory regimes. Secondly, I examine their public relations campaigns. Thirdly, and most importantly, multinational corporations reassessed the potential of agrichemicals and concluded that investments in seed were more promising than further investments in agrichemicals. This inspired them to design packages of agricultural inputs that synchronized seed and chemical inputs. I demonstrate this process by analyzing the decision-making process of the Swiss chemical company Ciba-Geigy around its investment in seed research. In the third section, I assess how these developments affected agricultural research initiatives and how this affected the position of multinational corporations in rural development in the long-term.

CRITICISM OF MULTINATIONAL COMPANIES IN THE LATE 1960S AND 1970S

The criticism of multinational corporations in the Green Revolution had several roots: firstly, the Green Revolution, as a model of agricultural development, exported the same environmentally detrimental, technocratic modes of production, which activists turned against domestically in the US. Secondly, anti-imperialist activists saw themselves confronted with an apparently overpowering military-industrial complex that in their view gained disproportionate influence on the political apparatus. Through development initiatives such as the Green Revolution, they saw similar imbalances of power between the economic, military, and political actors being exported to other parts of the world. This anti-imperialist critique was most visibly in its opposition to the US war in Vietnam. They criticized the sales and military usage of

defoliants such as Agent Orange (i.e. herbicides that had formerly also been used in agriculture). Thirdly, in a context in which economic globalization was gaining momentum, multinational corporations were able to widen their sphere of influence to other countries. Leftist critics interpreted this development as the global expansion of capitalism, which would solidify the gap between rich and poor. They confronted the Green Revolution as a capitalist approach to rural development, which, in their view, development policy-makers designed to create profits for large agribusiness corporations at the expense of the farmer.

On the first point, the first strand of criticism in the United States, domestic environmental criticism intensified in the course of the 1960s. A momentous catalyst was the publication of biologist Rachel Carson's *Silent Spring* (1962)—a powerful critique of the environmental impact of agrichemicals used in industrial models of agricultural production. She summarized existing scientific studies on the consequences of pesticides, and turned fundamental ecological principles into clear environmental messages. Restrictions on the usage of pesticides, especially dichlorodiphenyltrichloroethane (DDT), were the goal of her environmentalist activism, which found a great public response. By opposing the idea that science could be used to control nature, she challenged not only widespread modernist ideas but also the development doctrines of progress and growth.³³²

Carson's literary agent, Marie Rodell, warned her about writing about chemical companies, and wanted her to avoid direct confrontation; she asked her to frame her criticism in a way that would reduce the risk of multinationals undermining her credibility.³³³ As a result, *Silent Spring* does not read as an attack against corporations. Nonetheless, her forceful critique of industrially manufactured pesticides triggered a strong response from the chemical industry: agribusiness corporations attempted to cast doubts on her statements by painting her as a hysterical female

³³² Priscilla Coit Murphy, *What a book can do: The publication and reception of Silent spring*, (Amherst: University of Massachusetts Press, 2005); John Robert McNeill, "The Environment, Environmentalism, and International Society in the Long 1970s," in Niall Ferguson Ed., *The shock of the global. The 1970s in perspective* (Cambridge, Mass., London: Belknap, 2010).

³³³ Mark H. Lytle, *The gentle subversive: Rachel Carson, Silent spring, and the rise of the environmental movement*, (New York, Oxford: Oxford University Press, 2007), 156.

and claimed that Carson's scientific work was unproven, anecdotal, and inadequate. In public relations campaigns, corporations touted the safety and necessity of agricultural chemicals. Furthermore, Veliscol Chemical Company in Chicago threatened Carson's publisher with lawsuits and tried to stop the publication of her book. These attempts backfired and created only more publicity for her cause.³³⁴

Culturally, historian John Robert McNeill argues, "[a]t root, environmentalism was a complaint against economic orthodoxy, whether of the capitalist or Communist variety. It was a critique of the faith of economists and engineers, and their programs to improve life on earth."³³⁵ Environmentalists perceived multinational corporations as the representatives of this "economic orthodoxy," which embodied and advocated for the technocratic approach. As with Rachel Carson's critique, environmental criticism against the Green Revolution was not only directed against environmental destruction *per se*, but also opposed technocratic development strategies that aimed predominantly at economic growth and presumably neglected cultural particularities and human needs.³³⁶ By the end of the 1960s, debates about the impact of intensive agricultural practices slowly expanded to a global scale.

These debates tied to issues of population growth and global food production. The optimism of those who believed the Green Revolution would provide enough food for the growing population met the pessimism of environmentalists who stressed that the gains in food production came at the expense of human health and the environment. In these debates, multinational corporations positioned themselves as proponents of the Green Revolution, as proponents of successful technological solutions to increase food production and found in Nobel laureate Norman E. Borlaug a popular advocate. Seriously offended by environmentalist

³³⁴ Naomi Oreskes, Erik M. Conway, *Merchants of doubt: How a handful of scientists obscured the truth on issues from tobacco smoke to global warming*, (New York: Bloomsbury, 2010), 216-240; Lytle, *The gentle subversive*; Mark Stoll, "Industrial and agricultural interests fight back," *Environment & Society Portal*, 2012, accessed 10.10.2019, <http://www.environmentandsociety.org/exhibitions/silent-spring/industrial-and-agricultural-interests-fight-back>.

³³⁵ McNeill: "The Environment, Environmentalism, and International Society in the Long 1970s," 264.

³³⁶ Corinna Unger, *International Development*, 135.

criticisms of the use of agrichemicals, he feared for the legacy of his efforts in the ‘fight against hunger.’ As optimism and trust in technological progress faded and the social and environmental consequences of technocratic and large-scale development approaches entered mainstream societal thinking, Borlaug became an even louder and more radical critique of environmentalists. In a controversial speech at the FAO in Rome, he decried environmentalists as “myopic and hysterical” and called their policies “disastrous.”³³⁷ He got involved in emotion-laden and moralistic discussions with advocates of population control, such as environmentalist William C. Paddock, in which he weighed up the right to live against the limits of the environment. Both explored the limits of what was morally acceptable to advocate for in the apparently irreconcilable dilemma of environmental protection and the expansion of food production.³³⁸

Borlaug and Paddock’s arguments revolved around the core conflict between supporters and opponents of the Green Revolution: can a strategy that tries to fight world hunger at the expense of the environment be a good strategy? Had future technologies the potential to increase food production while being environmentally friendly in the long run? At the center of their discussion were the environmental toxins that Rachel Carson had also criticized, which, although they arguably enabled growth in agricultural production, also affected the lives of (future) generations. Paddock, who was a proponent of strict population controls, argued:

To feed today’s world population requires the use of agricultural chemicals, the pollutants of which will have a deleterious effect on our children and on their children. But we have seen nothing yet! By 1985, the demand for food in the hungry world will more than double. If the hungry world is to then feed itself, it must increase its use of

³³⁷ Vance Bourjaily, “One of the Green Revolution Boys,” *Atlantic Monthly*, 231, 02.02.1973, Folder 133, Box 3 Communications Office photographs, SG 1, RG 20, Rockefeller Archive Center, Sleepy Hollow, NY, 75.

³³⁸ William C. Paddock, *How Green is the Green Revolution?*, 08.15.1970, Folder 24, Box 2, Series 2: Cummings Family Files, Ralph W. Cummings, Jr. papers, Rockefeller Archive Center, Sleepy Hollow; Norman E. Borlaug to William C. Paddock, *Correspondence on criticism of William C. Paddock*, 09.07.1970, Folder 24, Box 2, Series 2: Cummings Family Files, Ralph W. Cummings, Jr. papers, Rockefeller Archive Center, Sleepy Hollow.

fertilizers by 100 % and its use of pesticides by 600 %. Such an increase in the use of chemicals to feed the projected populations could wreck our environment.³³⁹

The engineers of the Green Revolution trusted in the potential of technologies. Confronted with rapid population growth, they favored fast-track solutions to agricultural development such as mono cropping, which required the use of more agrichemicals to fight the vulnerabilities it created. In the Green Revolution, pesticides proved particularly stressful for the environment. The broad-spectrum pesticides proved to be indiscriminate killers. They killed harmful and helpful insects alike. Often, the chemicals also killed species further down in the food chain such as birds or reptiles. Moreover, without sufficient protection, which was often not available in so-called developing countries, farmers absorbed the toxins through the lungs and skin, which in some cases had lethal effects. Other parts of the Green Revolution package also proved harmful for the environment. The massive use of fertilizers damaged aquatic ecosystems and led to soil salinization. White crusts of salt appeared on the fields of cultivators, providing visual evidence of the shortsightedness of the Green Revolution in some places.³⁴⁰

In the 1970s, criticism increasingly focused on the difficulties of internationally enforcing environmental regulations. In 1979, Mark Dowie publicized a scandal that he referred to as “The Corporate Crime of the Century.”³⁴¹ He documented business leaders in the United States selling “shiploads of defective medical devices, lethal drugs [...], toxic pesticides, contaminated foods, and other products found unfit for American consumption” to so-called developing countries.³⁴² Environmental toxins, such as pesticides, banned in the United States, continued to be sold abroad. This reinforced the impression that multinational companies operated outside state regulations and thus exploited the unequal balance of power between the Global North and the Global South.

³³⁹ William C. Paddock, *How Green is the Green Revolution?*, 08.15.1970, Folder 24, Box 2, Series 2: Cummings Family Files, Ralph W. Cummings, Jr. papers, Rockefeller Archive Center.

³⁴⁰ McNeill, “The Environment, Environmentalism, and International Society in the Long 1970s,” 269–270.

³⁴¹ Mark Dowie, “The Corporate Crime of the Century,” *Mother Jones*, November 1979, 23.

³⁴² Ibid.

Secondly, the second strand of criticism, in opposition to the so-called military-industrial complex, leftist, anti-war, and environmentalist activists developed anti-corporate sentiments, which found particularly strong expression in the activism against the use of Agent Orange in the Vietnam War. The military-industrial complex described the strong ties between, *inter alia*, the chemical industry and the military. During World War II, chemical and pharmaceutical companies had acquired great prestige from the development of penicillin, napalm, and DDT. The collaboration with the military and government agencies continued when chemical companies developed a broad range of chemical weapons as a ‘means of survival’ in the Cold War battle with Communism. In this prosperous military-industrial partnership, chemical companies developed a diversity of new organic chemicals after 1920 and at an increased rate after 1945; scientists and military researchers developed chemicals that killed humans and pests side by side. Hence, some chemicals were applicable for the use in agricultural production and in the military alike. In the case of the environmental damage at home and herbicidal warfare abroad, this reached a point that the distinction between war abroad and peace at home became blurred.³⁴³ Many of the chemicals used were non-degradable and toxic, so once deployed in the environment, they became persistent hazards, both at home and abroad.³⁴⁴

Applied from air across rural areas in Vietnam, defoliants such as Agent Orange attacked the health of Vietnamese farmers and the environment alike. Images of harmed children and environmental destruction caused a public outcry. Chemical corporations that manufactured constituents of Agent Orange especially bore the brunt of criticism.³⁴⁵ The protests against pesticides united protests against chemical warfare in Vietnam with domestic environmental concerns; this union of the environmental movement with the anti-war movement took on an increasingly international outlook. Furthermore, historian Corinna Unger argues, “the outrage

³⁴³ David Zierler, *The invention of ecocide: Agent Orange, Vietnam, and the scientists who changed the way we think about the environment*, (Athens: University of Georgia Press, 2011), 11.

³⁴⁴ John Robert McNeill, “The Environment, Environmentalism, and International Society in the Long 1970s,” in Niall Ferguson Ed., *The shock of the global. The 1970s in perspective* (Cambridge, Mass., London: Belknap, 2010), 264; Edwin A. Martini, *Agent Orange: History, science, and the politics of uncertainty. Culture, politics, and the cold war* (Amherst: University of Massachusetts Press, 2012).

³⁴⁵ Martini, *Agent Orange*.

of the brutality of the war helped to trigger a romanticized image of peaceful and sustainable peasant life in harmony with nature which seemed to be superior to Western technology.³⁴⁶ Academic institutions reflected this through the emergence of the field of Peasant Studies and in the field of Subaltern Studies in India. As they arguably ignored and disguised the risks of their technologies, such as defoliants used in the Vietnam War, multinational corporations embodied the cultural insensitivity and selfishness of technology transfers and were the target of academic criticism in both fields.

Thirdly, the third strand of criticism focused on the transnational activities of corporations, which had increased rapidly after the Second World War. US president Harry Truman trusted in his Point Four Program of 1949 in American business as a source of capital and technology to trigger economic development in so-called developing countries. He saw their capital and expertise as a means to legitimize their international, profit-seeking activities. With the growing extent of corporate activities, however, this legitimacy was put into question: “By what right do a self-selected group of druggists, biscuit makers, and computer designers become the architects of a new world?”³⁴⁷ asked, for example, the scholar-activists Richard J. Barnet and Ronald E. Muller. Their book, *Global Reach* (1974), was one of the first books critical of the effects of what would come to be known as globalization. For them, the lack of regulatory control of multinational corporations and their attempts to transcend the nation-state were illegitimate. More and more scholars questioned the political and economic impact of multinational corporations and demanded international regulation and the empowerment of national governments,³⁴⁸ after US administrator David Lilienthal coined the term ‘multinational

³⁴⁶ Corinna Unger, *International Development*, 136.

³⁴⁷ Richard J. Barnet, Ronald E. Müller, *Global reach. The power of the multinational corporations*, (New York: Simon & Schuster, 1974), 25.

³⁴⁸ In the 1950s and 1960s, the number of multinational corporations and their parts in global business had expanded rapidly. For example, the number of subsidiaries of US American multinational corporations more than tripled and the size of the subsidiaries more than doubled. Stephen J. Kobrin, “Multinational Corporations, the Protest Movement, and the Future of Global Governance,” Alfred D. Chandler, Bruce Mazlish, *Leviathans: Multinational Corporations and the New Global History*, (Cambridge: Cambridge University Press, 2005), 220.

corporation' in 1960.³⁴⁹ These scholars portrayed multinational corporations as dangerous to the political and economic welfare of poorer countries, and as threats to the sovereignty of nation states. For example, in 1968, economist Raymond Vernon questioned if the economic sovereignty of nation states were at bay, observing massive shifts in power relations.³⁵⁰

Marxist scholars saw this development through the lens of theories of (neo-) imperialism, arguing that poverty and dependence were systemic and structural elements. Scholars such as Osvaldo Sunkel argued that whereas in colonialism, a political and military apparatus had executed control in the periphery directly, in economic (neo-) imperialism, multinational corporations and their economic activities executed this power.³⁵¹ In the context of the Green Revolution, Marxist economist Harry M. Cleaver saw multinational corporations as the henchmen of the capitalist system subordinating and exploiting the peasants of the Global South. His criticism focused on multinational corporations as a group and he did not single out the activities of individual companies.³⁵²

Governments of so-called developing countries applied this criticism in real political initiatives. In 1964, a coalition comprised mostly of so-called developing countries—the Group of 77 (G-77)—formed at the United Nations Conference on Trade and Development to make their demands heard by a global audience. As part of their agenda, these governments attempted to limit the activities of foreign corporations and wanted to challenge the dominance of industrial nations in the international economic system. In the early 1970s, this found expression in the expropriation of foreign investment, which increased on a worldwide scale. Between 1960 and 1992, in total, American investors experienced 575 cases of expropriation; 336 of these acts of

³⁴⁹ David Lilienthal, "The Multinational Corporation," 1960, in Ashen Melvin and G.L. Bach, eds., *Management and Corporations*, (New York: McGraw-Hill, 1985).

³⁵⁰ Raymond Vernon, "Economic Sovereignty at Bay," *Foreign Affairs* 47, 1, 110–122.

³⁵¹ Stephen J. Kobrin, "Multinational Corporations, the Protest Movement, and the Future of Global Governance," 222–23; Osvaldo Sunkel, "Big Business and 'Dependencia': a Latin American view," *Foreign Affairs*, 50, no. 3, 517–31.

³⁵² Harry M. Cleaver, "The Contradictions of the Green Revolution," *The American Economic Review*, 62, 177–86.

expropriation occurred between 1970 and 1975: 32.7 per cent in Latin America, 6.8 per cent in Asia, 17.3 per cent in North Africa and the Middle East, and 43.2 per cent in Africa.³⁵³

In May 1974, members of the G-77 supported a far-reaching initiative at the General Assembly of the United Nations to install a New International Economic Order (NIEO) and to reform the international economy. From the perspective of the supporters of the initiative, the international economy was inequitable and biased against the Global South. For them, in order to achieve political self-determination and sovereign equality among all nations “global redistribution was [...] a precondition for meaningful development in the Third World” and a “natural and necessary extension of the anticolonial project.”³⁵⁴ As the basis of this New Order, twenty principles were laid out, including a moratorium on debt, right to choose a socio-economic system, sovereign equality of all states, the sovereignty over national resources and economic activities including nationalization. One principle defined the regulation and supervision of transnational corporations by states to protect the sovereignty of those countries.³⁵⁵

In the immediate aftermath of the declaration of the NIEO, a “Group of Eminent Persons to Study the Impact of Multinational Corporations on Development and International Relations” formed and organized hearings of leaders of so-called developing countries, political activists, and labor unions, who all voiced strong criticisms of multinational corporations.³⁵⁶ A report summarized these criticisms and recommended more governmental control of multinational

³⁵³ Vente Oliveiro, “The United States, Multinational Enterprises, and the Politics of Globalization,” in Niall Ferguson Ed., *The shock of the global. The 1970s in perspective* (Cambridge, Mass., London: Belknap, 2010), 144; Stephen J. Kobrin, “Expropriation as an Attempt to Control Foreign Firms in LDCs: Trends from 1960 to 1979,” *International Studies Quarterly*, 28 (1984), 329–48.

³⁵⁴ Jennifer Bair, “Corporations at the United Nations: Echoes of the New International Economic Order?,” *Humanity*, 6, 1, 2015, 159–71, 159.

³⁵⁵ Corinna Unger, *International Development*, 133; Iris Borowy, “Science and Technology for Development in a Postcolonial World. Negotiations at the United Nations, 1960-1980,” *NTM*, 26, no. 1 (2018), 31–62; Giuliano Garavini, “From Boumedienomics to Reaganomics: Algeria, OPEC, and the International Struggle for Economic Equality,” *Humanity: An International Journal of Human Rights, Humanitarianism, and Development*, 6, no. 1 (2015), 79–92; Nils Gilman, “The New International Economic Order: A Reintroduction,” *Humanity*, 6, no. 1 (2015), 1–16; Victor McFarland, “The New International Economic Order, Interdependence, and Globalization,” *Humanity* 6, no. 1 (2015), 217–34.

³⁵⁶ Vente Oliveiro, “The United States, Multinational Enterprises, and the Politics of Globalization,” 148.

corporations, executed through a Code of Conduct to regulate corporate power. The recommendations of the report were never implemented. Historian Jennifer Bair stresses that this proposal intended as a Code *for* corporations as “binding instrument capable of restricting in activities of multinationals [...] and subordinating corporate power to state power” turned into a Code *on* corporations, when a section on the responsibilities of governments toward foreign investors was included.³⁵⁷ The US government intervened to include this section in order to protect the interests of US multinational corporations in a free-market economy. As a result, in the course negotiations on the Code, the United States managed to “lay the foundation for the increasing acceptance of the principle that governments should refrain from authoritative intervention against multinational business.”³⁵⁸

Historian Nils Gilman stresses that despite the failure of the NIEO in the course of the 1970s, proponents and adversaries of the suggested policies made the possibility of a radically different economic world plausible.³⁵⁹ Companies became aware that their activities did not take place in a vacuum, but needed promotion in the existing international economic system. Should this or its regulations change significantly, there was a potential threat to their existing areas of business. Not only did geopolitical initiatives aimed to regulate multinational corporations, but the various environmentalist and leftist criticisms created an hostile environment, in which multinational agribusiness corporations had to reposition themselves, had to lobby actively to keep their products on the market, and to avoid strict regulations. It was especially the products marketed for the Green Revolution, such as pesticides and fertilizers, which became targets of criticisms because of their harmful environmental effects. In the following section, I present the institutional, public relations, and technological responses of multinational corporations in the 1970s.

³⁵⁷ Jennifer Bair, “Corporations at the United Nations,” 160.

³⁵⁸ Vente Oliveiro, “The United States, Multinational Enterprises, and the Politics of Globalization,” 150.

³⁵⁹ Gilman, “The New International Economic Order: A Reintroduction,” 9.

COUNTER-STRATEGIES OF MULTINATIONAL CORPORATIONS IN THE 1970S

The changing academic and public perception of multinational corporations in the 1970s meant the latter had to position themselves anew: their products were subject to increasing regulation and they publicly pilloried for the environmental damages they caused. Yet, multinational corporations found ways to emerge stronger from this apparently hostile environment. On the one hand, their products, especially during the oil crisis of 1973, were in short supply—a situation which created higher prices and which gave the corporations room for maneuver. In international policy-making, multinational companies gained influence through initiatives such as the Industry Cooperative Programme described in chapter 4. Meanwhile, initiatives such as NIEO opposed their increasing influence in the United Nations and initiated an Intergovernmental Working Group of the Commission on Transnational Corporations, a forum intended to regulate their activities. A Damocles sword of a possible worldwide ban or strong regulation of pesticides for agricultural use hovered over the agribusiness industry. Industry leaders tried to avoid this regulation. Firstly, they acted within the established institutions to lobby for weak regulation of pesticides; secondly, they communicated a positive self-image in public using their image as successful partners in the Green Revolution; thirdly, chemical companies decided to invest in biotech seed research as the future prospects for agrichemicals were bleak. This opened up new business opportunities and gave them new influence over how agricultural production practices were designed and marketed, a decision, which paved the way from the Green to the Gene Revolution.

INSTITUTIONAL RESPONSES: USE OF ESTABLISHED LOBBY INSTRUMENTS

In the course of the 1960s, multinational corporations—as development experts providing technologies and know-how—gained influence and access to state organizations and international organizations. They organized themselves in initiatives such as the US Agribusiness Council, the Industry Cooperative Programme of the Food and Agriculture Organization, or were members of advisory boards. Confronted with criticisms and potential regulations, multinational corporations turned to use these established channels to avert severe restrictions of their business activities. In the following, I present how multinational corporations used some of the institutionalized lobby channels to influence international regulations of pesticides using the example of the Industry Cooperative Programme (ICP).

The Industry Cooperative Programme arguably opened many doors for multinational corporations within the system of the United Nations: in 1974, for the first time in history, multinational corporations participated at a conference of the United Nations, the World Food Conference. The 69 corporate participants focused on resolutions concerning the use of pesticides and fertilizers and attempted to weaken state regulatory powers.³⁶⁰ Furthermore, in the course of the 1970s, corporate actors gained increasing influence in choosing staff within the institutions of the United Nations. In this context, historian Sabine Pitteloud's research shows that Swiss corporations worked actively as a united force in the 1970s to influence the international regulatory body by positioning people close to their interests in these institutions. Furthermore, multinational corporations collaborated closely with government officials to avert possible regulations. Corporate leaders did not take for granted their ability to extend their economic activities across the globe, but understood that their activities were dependent on an international institutional framework that created these opportunities.³⁶¹

According to Christian Gerlach, the ICP, in particular, was "an ideal avenue by which multinationals could enter and manipulate the UN system and thereby penetrate non-industrialized countries."³⁶² For the agribusiness industry, however, the expansion to markets in so-called developing countries proved not to be the primary target, as demand was much lower in the Global South than the Global North. Yet the ICP opened a door to the United Nations System to influence international policy-making in a way that enforced an international economic order that allowed multinational corporations to act freely with little regulation.

The ICP organized its activities in so-called working groups, covering dairy industry development, farm mechanization, forestry and forest industries, meat production, use of

³⁶⁰ Christian Gerlach, "Der Versuch zur globalen entwicklungspolitischen Steuerung auf der World Food Conference von 1974," *WerkstattGeschichte*, 31 (2002): 50–91.

³⁶¹ Christian Gerlach, *Illusions of Global Governance*; Sabine Pitteloud, "Swiss multinationals facing the creation of international guidelines in the 1970s. Between foreign diplomacy and coordinated capitalism," Working paper for the Workshop on Multinational Corporations and the Politics of International Trade 23 April 2019, European University Institute, Florence.

³⁶² Christian Gerlach, *Illusions of Global Governance*, 196.

plastics in agriculture, pesticides, protein food development, and fisheries. All working groups held joint meetings with FAO technical divisions to exchange information and ideas, to sponsor projects, and to determine future action.³⁶³ Yet, in general, the impact of these working groups was limited. They initiated barely any development projects on a larger scale or with strong economic implications for the participating actors.

However, some working groups gained more influence than others did. In the Pesticide Working Group of the ICP, which united companies controlling 90 per cent of world production, members lobbied cooperatively in favor of what they perceived as “adequate” legislation, and advised governments on infrastructure for manufacturing, formulating, and distributing pesticides. The Pesticide Working Group was among the most active ICP groups and organized a series of seminars in cooperation with the World Health Organization (WHO) on public health aspects of the use of pesticides.³⁶⁴ Especially in the realm of farmers’ training, corporate leaders demanded stronger involvement of state institutions; they usually did not get in touch with farmers directly, which would have been a costly endeavor.³⁶⁵ In order to continue with their business as usual and not to get involved with farmers directly, corporations demanded other forms of regulation: for example, the German chemical company BASF demanded the ICP to develop international symbols for the right labeling and storage of pesticides.³⁶⁶ Their common sales strategies based on manuals, which explained the correct use of the products, also in terms of safety measures. BASF’s subsidiary, which was responsible for the extension service, frequently reported difficulties with the manual approach as these training tools had limited applicability in areas with high rates of illiteracy. In this context, press reports of “frequent cases of complete disregard for all written instructions and, even worse, absolute neglect of common

³⁶³ Industry Cooperative Program, “The FAO/ Industry Cooperative Program,” undated, Folder 8, Box 22, Industry Cooperative Program, FAO Archives, Rome, 2.

³⁶⁴ Neal Schemet, “ICP Training Resource Survey,” 02.01.1977, Folder 44 Agricultural Research, Extension And Training, Box 22, Collection IP, FAO Archive, Rome.

³⁶⁵ Ibid.

³⁶⁶ Metzger and Köhler, BASF to Alexander G. Friedrich, “Research, extension, training,” 05.12.1975, Folder Agricultural Research, Extension And Training, Box 44, Collection IP 22, FAO Archives, Rome.

CHAPTER V

sense”³⁶⁷ were not surprising. Such press reports put companies under pressure to act, and international labeling standards were an easy way to comply with international regulations without changing the way they operated. With the appropriate symbols only, they would have adhered to international safety standards. Meanwhile, they were spared the cost of safety training.

From the perspective of the corporations, regulations were a potential obstacle to business, but for strategic reasons, opposing regulation was not sensible. Multinational corporations had to face the situation and participate in regulatory activities of governments and international organizations in order to keep their hazardous chemicals on the market. It was in their interest to develop rules and regulations to govern the use of pesticides, since the alternative—banning the use of pesticides altogether—was widely discussed. In the course of the 1970s, the United Nations Industrial Development Organization (UNIDO), the Food and Agriculture Organization (FAO), the World Health Organization (WHO), and the United Nations Environment Program (UNEP) approached multinationals to work out guidelines for the “proper, safe and effective use of pesticides.”³⁶⁸ To avoid strict regulations or a potential ban of pesticides, corporate leaders such as J. A. Smith, manager of Shell International Chemical, stressed the role of pesticides in increasing world food production:

All who have an interest in world food production are interested in maintaining a reasonable balance between optimum use of pesticides as an agricultural tool and sensible control of this use to prevent misuse and damage to the environment. It would appear to many of us that over the past decade advisory guidelines and legislation have tended to be unduly restrictive to pesticide use, with consequent detriment to food production.³⁶⁹

³⁶⁷ FMC, “Wider controlled use of pesticides possible with education and government coordination,” 06.10.1974, Folder 14 Working group on pesticides 1973 Vol. X, Box 22, Collection IP, FAO Archives, Rome.

³⁶⁸ FAO Industry Cooperative Program, “Industry Spokesmen Clarify Economics of Pesticide Development and Use,” 1974, Folder Working group on Pesticides XVI, Box 14, Collection IP 22, FAO Archives, Rome.

³⁶⁹ J.A. Smith, “Shell International Chemical Co. Ltd., Pesticides Working Group, Comments on a FAO Proposal for Increasing Food Production through improved Plant Protection Programmes,” 07.09.1974, FAO Archives, Box 22, Folder 14, Collection IP, FAO Archives, Rome.

By referring to the regulation of pesticides as a “detriment to food production,” Smith turned the regulation of pesticides rhetorically into an obstacle in the ‘fight against hunger.’ By highlighting their scientific experience, discrediting environmental concerns for being ‘emotional,’ and stressing the positive impact of the use of agrichemicals for increasing food production, Smith and others tried to establish corporations as the reasonable actors in the expansion of food production. This image of corporations prevailed, and legislative bodies in the FAO/ICP soon came to understand multinational corporations as “realistic allies” in the regulation of pesticides. Hence, the Industry Cooperative Programme allowed corporations to contact high-ranking executives directly, present their visions of future regulations at international conferences, and position themselves as experts on agricultural development. However, not all FAO executives shared this vision and some officials opposed attempts to rein in further regulation.

The developments in the Industry Cooperative Programme highlighted the contradictions of the role of multinational corporations in the 1970s: in 1974, the influence of multinational companies reached its zenith with their participation in the World Food Conference. In the same year, while allowing for the participation of corporate actors in decision-making bodies, the ICP was terminated, because it had lost popularity within the FAO.³⁷⁰ A much-hailed model of public-private cooperation in the efforts to end hunger, the program soon faded into oblivion.

Hence, the FAO was not the only organization considering the cooperation with multinational corporations to achieve its ends, but it did so in the most institutionalized form, acknowledging partnerships with the industry as a favorable option. The initiation of the ICP pioneered the concept of public-private partnerships (PPPs) in international organizations and allowed for larger influence of multinational corporations in the system of the United Nations.³⁷¹

³⁷⁰ Susan George, *How the other half dies: The real reasons for world hunger* (Harmondsworth: Penguin, 1976).

³⁷¹ Alexander Gunther Friedrich and Valence E. Gale, *Public-private partnership within the United Nations system: Now and then* (Bielefeld Germany: W. Bertelsmann Verlag, 2004).

PUBLIC RELATIONS CAMPAIGNS

In February 1974, the Agribusiness Council under the chairmanship of the US business leader Henry J. Heinz II and Victor Umbrecht, Ciba's man for international affairs, held a conference named "Science and Agribusiness in the 1970s" in London. They invited about a hundred business, financial, research, international agency, and government leaders from all over the world, but mainly from the Global North. The aim of the conference was to stimulate agribusiness investments in so-called developing countries. Opportunities in agricultural development were presented by a list of leading experts that read like a *Who's Who* of the Green Revolution, including: Robert Chandler, the former director of the International Rice Research Institute; Ralph Cummings, former director of the agricultural division of the Rockefeller Foundation in India; E. J. Wellhausen, formerly plant breeder at the CYMMIT in Mexico; and Lester Brown, Foreign Agricultural Service of the US Department of Agriculture. The large-scale conference appeared like an effort to take the Green Revolution approach of rural development along and to revive it in the next decade.³⁷²

During the conference, multinational corporations had the chance to present themselves side by side with reknown scientists, as 'fighters' in the ongoing 'fight against hunger.' In the early 1970s, media usually rather covered the health hazards of the usage of agrichemicals. Conferences like these gave the corporations a chance to present themselves in a different light. Their magazines and own publication channels had a limited reach only but were also frequently used to stress the role of chemical companies for the Green Revolution.³⁷³ The articles' choice of words and orientation reflected the Malthusian discourse. The companies wanted to stress: Hunger was humankind's greatest problem and it was impossible to solve without the chemical industry. The industry found popular advocates to support this claim. In 1973, Norman E.

³⁷² Agribusiness Council, "Science and Agribusiness in the Seventies," 04.1974, Folder 1984, Box 323, Collection Rockefeller Foundation 1.5, Rockefeller Archive Center, Sleepy Hollow, NY.

³⁷³ Monsanto Chemical Facts Bulletin, "Pesticides in a hungry world, Vol.3, No. 7," 08.1978, Box 29, Pubs. (Serials) Series 08, Monsanto Company Records (WUA00131), Washington University Archives, St. Louis, Missouri. Bernhard Timm, "Chemie und Ernährung im Jahr 2000, Die BASF," 04.1970, BASF Archives, Ludwigshafen.

Borlaug published an article in the company magazine *Bayer Berichte* and demanded that future agricultural development was to continue using agrichemicals:

It is obvious that the green revolution can only bring further success if agriculture is allowed to use the production factors essential for the fight against hunger, i.e. artificial fertilizers and pesticides, but if it refuses to do so, as currently demanded by an influential group led by extremists, then humanity will really perish, not from poisoning but from hunger.³⁷⁴

A majority of Bayer's employees shared Borlaug's perception that agrichemicals were not a hazard but a solution to a problem of a larger and more important dimension: hunger. The employees stood behind the products they marketed and questioned the published figures of the World Health Organization, which estimated that the use of pesticides poisoned 500,000 people every year, 5,000 people lethally.³⁷⁵ Bayer carried out own projections questioning the adequacy of statistical information. In internal letters, one employee presented detailed cases to illustrate that the properties of the product did not cause lethal cases but the inadequacy of its handling. He pointed to cases of suicides, neglects in the duties of supervision causing children to drink the chemicals, or mental disabilities of the workers. In 1981, Bayer asked the World Health Organization, no matter "how frivolous or cynical it may seem," to recalculate figures.³⁷⁶

In the course of the 1960s and 1970s, media globalized and covered news increasingly on a global level. This heightened a global consciousness and made the effects of the agrichemicals in Vietnam or India as visible as the impact of the corporate factories at home.³⁷⁷ For multinational corporations this meant that they had to adapt their media strategy and further

³⁷⁴ "Es liegt auf der Hand, dass die Grüne Revolution nur dann weitere Erfolge bringen kann, wenn der Landwirtschaft gestattet wird, die für den Kampf gegen den Hunger unerlässlichen Produktionsfaktoren zu benutzen, d.h. Kunstdünger und Pestizide, Wenn ihr dies aber verwehrt wird, wie es gegenwärtig eine von Extremisten angeführte Einflussgruppe fordert, dann wird die Menschheit wirklich zugrunde gehen, aber nicht an Vergiftung, sondern an Hunger." Norman E. Borlaug, Im Kampf gegen den Hunger, *Bayer Berichte*, 30/1973, Bayer Archives, Leverkusen, (translation by the author).

³⁷⁵ H.H. Kramer, "Notiz: Vergiftungsfälle durch Pflanzenschutzmittel," 04.06.1977, Folder Dr. Gessner, Pflanzenschutzbriefe, Series B, 1977–1985, 450/89, Vol. 2, Bayer Archives, Leverkusen.

³⁷⁶ Bayer AG, Sparte Pflanzenschutz to World Health Organization, "Incidence of pesticide poisonings," 11.27.1981, Pflanzenschutzbriefe, Series B, 1977–1985, 450/89, Vol. 2, Bayer Archives, Leverkusen.

³⁷⁷ Terhi Rantanen, *The media and globalization* (London: SAGE, 2005), 22.

professionalize their Public Relations department. As the ‘fight against hunger’ continued to dominate international development debates, it made sense for multinational corporations to present themselves positively within it. However, the future of the use of agrichemicals was uncertain and multinational corporations sought technological solutions to prepare their agrichemical divisions for the future.

TECHNOLOGICAL SOLUTIONS: CORPORATE INVESTMENTS IN SEED BUSINESS IN THE 1970s

Principally, multinational corporations could have invested in the research for agrichemicals. However, research for environmentally friendlier pesticides had a simple problem: The more selective the pesticide, the smaller the market for the investing corporation. Although these selective pesticides were less harmful for the environment and the chance for regulations smaller, high research costs made research in selective pesticides less likely. In 1974, a new pesticide required approximately “more than 10 years of research and a cost of 10–15 million dollars from discovery to first sale of the pesticide.”³⁷⁸ By then, 40 to 50 per cent of the development costs of a new compound was directed toward investigating safety.³⁷⁹ Because of high research and development costs for new compounds, it appeared more effective for corporations to influence the regulation of different authorities than to invest in pesticides that were more environment-friendly.

However, with biotechnological discoveries of the 1970s, chemical corporations found a way to diversify their portfolio by investing in seed research that promised more environment-friendly approaches to improve yields. Major discoveries in biotechnology opened new business opportunities, revolutionized research, and brought about a new intellectual property rights regime for plants and their parts.³⁸⁰ In 1973, Stanley Cohen and Herbert Boyer pioneered in the

³⁷⁸ Industry Cooperative Programme, “Emergency Measures in regard to the supply of fertilizers and pesticides,” 06.10.1974, Folder 14, Box 22, Collection IP, FAO Archives, Rome.

³⁷⁹ FAO/ICP Nairobi Pesticide Seminar, “Industry Spokesmen Clarify Economics of Pesticide Development and Use,” 1974, Folder 14f, Box 14, Working group on Pesticides XVI, Collection IP, FAO Archives, Rome.

³⁸⁰ Jack Ralph Kloppenburg, *First the seed: The political economy of plant biotechnology, 1492-2000* (Madison: University of Wisconsin Press, 2004).

recombinant DNA experiments and invented a technique that enabled the splicing of genes by transferring genetic information from one organism into another, the Cohen-Boyer r-DNA technique. With this technique allowing for the targeted manipulation of genetic material, investing in seed became a new opportunity for the chemical industry that hoped to combine self-bred varieties with the selective use of specific pesticides. One of the chemical companies that invested in seed research was the Swiss company Ciba-Geigy, whose decision-making to invest in seed research, I analyze in the following.³⁸¹

On August 25, 1972, the agrichemical division of Ciba-Geigy offered the board of directors a proposal to enter the seed business. The agrichemical department was searching for an investment opportunity to lay a broader base for its agrichemical activities. In their initial plans, the division intended to build up activities first in countries with ‘modernized’ agriculture, especially Europe and the United States, and only in a second step to expand in further regions (namely so-called developing countries and the Eastern bloc).³⁸² The proposal appeared to be attractive, as beyond the initial acquisition cost, the corporate management expected growth to be largely self-sustained. In the 1980s, the corporate management argued explicitly that the revenues of chemicals should be replaced by the revenues of the seed business:

The rationale for our participating in the Plant Genetics business continues to be the expectation that this business will gain in weight considerably, partly at the cost of the traditional Plant Protection industry, due to - the impact of biotechnology- pressure from the environment.³⁸³

³⁸¹ Zentralsekretariat, “Zusatzprotokoll zum Konzernleitungsprotokoll Nr. 22/73,” 06.12.1973, Folder Saatgeschäft der Division Agrarchemie Protokollauszüge, AC 7, Collection Ciba-Geigy Firmenarchiv, Novartis Archives, 7.

³⁸² Zentralsekretariat, “Zusatzprotokoll zum Protokoll Nr. 16/ 72 vom 5. September 1972 zu Fragen der Unternehmenspolitik,” 2–3.

³⁸³ Zentralsekretariat, “Auszug aus dem Konzernleitungsprotokoll Nr 35-85,” 10.23.1985, Saatgeschäft der Division Agrarchemie Protokollauszüge, AC 7, Collection Ciba-Geigy Firmenarchiv, Novartis Archives, Basel, 1.

Perceiving “seed as the carrier of biotechnology,”³⁸⁴ the board understood plant-breeding activities as the key to determine the interplay of different production factors in agriculture to raise productivity. Furthermore, seeds offered a larger market than agrichemicals. Already in 1972, the volume of the market for seeds in Europe (SFr. 1.702 million) had a comparable size to the pesticide business (SFr. 1.724 million).³⁸⁵ Ciba-Geigy’s management understood the markets for seeds as market of the future and decided to invest heavily in this sector. Hence, from the 1970s, investing in seed was at the core of the corporation’s strategic plan. Yet, the first attempts of Ciba-Geigy to acquire a seed company, the West-German KWS (Kleinwanzlebener Saatzucht) failed.

Other chemical and pharmaceutical companies complicated Ciba-Geigy’s first attempts to get a foothold in the seed business in 1972. They made similar strategic considerations as other chemical companies such as Monsanto had decided earlier to acquire seed companies. By the mid-1970s, few investment opportunities remained.³⁸⁶ Ciba-Geigy entered the seed business in 1974 with the acquisition of Funk Seeds International. The company had a good reputation and understood to be the last chance to acquire a seed company in the United States. In the 1970s, investing in the seed business was at the core of the strategy of agrichemical companies such as Ciba-Geigy to make their agribusiness departments profitable in the future. This decision, however, had massive implications for the design of agricultural technologies.

³⁸⁴ T.W. Parton, “Konzernleitungssitzung Nr. 18 1987: Wheat Strategy- Acquisition proposal, ” 05.04.1987, Folder Saatgeschäft der Division Agro, Protokollauszüge, AC 7, Collection Ciba-Geigy Firmenarchiv, Novartis Archives, Basel 8.

³⁸⁵ T.W. Parton, “Konzernleitungssitzung Nr. 18 1987: Wheat Strategy- Acquisition proposal, ” 05.04.1987, Folder, Saatgeschäft der Division Agro Protokollauszüge, AC 7, Collection Ciba-Geigy Firmenarchiv, Company Archive of Novartis AG, 8.

³⁸⁶ Divisional Management Committee of the Agricultural Division, “Minutes of the Meeting 10/87 of the June 11, 1987,” 06.11.1987, Folder Saatgeschäft der Division Agrarchemie Protokollauszüge, AC 7, Collection Ciba-Geigy Firmenarchiv, Novartis Archives, Basel, 2; “Auszug aus Konzernleitungsprotoll 49/73: Diverses,” 12.1973, Folder Saatgeschäft der Division Agro Protokollauszüge, AC 7, Collection Ciba-Geigy Firmenarchiv, 1; “Konzernleitungssitzung Protokoll Nr.5A/ 1974,” 02.04.1974, Folder Saatgeschäft der Division Agro Protokollauszüge, AC 7, Collection Ciba-Geigy Firmenarchiv, Novartis Archives, Basel, 2–3.

**FROM THE GREEN TO THE GENE REVOLUTION: CORPORATE DOMINANCE IN
BIOTECHNOLOGICAL RESEARCH**

The acquisition of seed companies by the agrichemical industry in the course of the 1970s and 1980s was often compared to an “unholy marriage” as seed was seen as the nexus of the agricultural production process.³⁸⁷ Critiques of these mergers assumed a “chemical bias” in future research activities of the enlarged multinational corporations. They feared that chemical corporations encouraged their seed subsidiaries to develop varieties that required large inputs of fertilizer and pesticides. In some respects, the critics were right, as the bundling of seeds and agrichemicals soon turned into common practice.

For Ciba-Geigy, the synergies of plant protection and seed research first materialized in their seed research in sorghum.³⁸⁸ In 1979, Ciba-Geigy introduced a “unique” package for sorghum, the result of the Ciba-Geigy’s cooperation with Funk Seeds International. It consisted of Funk’s high-yielding variety of sorghum, a safener (i.e. a chemical to avoid losses during storage), and two herbicides developed by Ciba-Geigy’s agrochemical division (Concep, Bicep, and Milocep). Under the trademark *herbshield*, seeds developed by the subsidiary Funk were treated with the safener Concep. The seedlings of the treated sorghum variety could not be damaged by metolachlor, the grass-killing component of Bicep and Milocep. The magazine *Farm Chemicals* celebrated productivity increases of 19 per cent.³⁸⁹

Ciba-Geigy’s package created a prototype of combined usage of seed and pesticides. In the same year, the economist Kenneth A. Dahlberg expressed his fears that multinational companies gained full control over the Green Revolution package in his book *Beyond the Green Revolution* (1969).³⁹⁰ In his view, the introduction of fixed packages of seed and chemicals

³⁸⁷ Jack Kloppenburg, Martin Kenney, “Biotechnology, Seeds, and the Restructuring of Agriculture,” *Insurgent Sociologist* 12, no. 3, 1984: 8

³⁸⁸ Konzernleitungssitzung, “Protokoll Nr. 18A/83: Einziges Traktandum; Division AG Segmentsbesprechung Saat Fortschrittsbericht,” 6.

³⁸⁹ Farm Chemicals, “Ciba-Geigy Introduces unique “Package” for Sorghum,” *Farm Chemicals* 142, no. 7 (1979): 55.

³⁹⁰ Kenneth A. Dahlberg, *Beyond the Green Revolution*, 112–116.

limited the farmers' autonomy to combine seeds, herbicides, and pesticides freely and potentially increased the profits and power of multinational corporations in the agricultural process at the expense of the cultivator.

Scholars such as Govindan Parayil coined the shift in research actors and practices of the 1970s and 1980s and its effects on international development as a shift from the "Green" to the "Gene" Revolution. Sometimes this shift is also called Bio- or biotechnological revolution.³⁹¹ Most historians understand the Gene Revolution to be the successor of the Green Revolution and see in the change from public to private institutions the main difference between the two so-called revolutions. In the Green Revolution (quasi-) public research institutions and government agencies were the protagonists in research initiatives, extension stations, irrigation facilities, and seed and fertilizer distribution systems. In the Gene Revolution, however, dated to start in the 1980s, the private sector took over the research and distribution of new technologies.³⁹²

For four reasons, the research of public institutions such as land-grant universities in the United States lost significance in comparison to the large research initiatives at Harvard University or the Massachusetts Institute of Technology in the 1970s. For one reason, these universities found financially strong partners in the chemical and pharmaceutical industry for molecular and cell biology—the parent discipline of biotechnology. Secondly, land-grant universities suffered from the fiscal austerity in national and state governments. Thirdly, the new Intellectual Property Rights regime based on the passage of the Plant Variety Protection Act and Supreme Court decisions permitted the patenting of genetically modified life forms, which made plant breeding much more interesting to the industry.³⁹³ Fourth, the expectations regarding the active roles of public research institutions had changed. Public research institutions no longer had the task to innovate plant breeding, but received the order to lay the groundwork for the applied research

³⁹¹ Frederick H. Buttel, Martin Kenney, Jack Kloppenburg, "From Green Revolution to Biorevolution: Some Observations on the Changing Technological Bases of Economic Transformation in the Third World," *Economic Development and Cultural Change*, 34, no. 1 (1985).

³⁹² Govindan Parayil, "Mapping technological trajectories of the Green Revolution and the Gene Revolution from modernization to globalization," *Research Policy*, 32, no. 6 (2003): 973.

³⁹³ Buttel et al., "From Green Revolution to Biorevolution," 41.

conducted in multinational companies. A 1982 report of the Rockefeller Foundation asserted similarly that in the future private sector expertise should replace public expertise:

Private sector expertise should be fully utilized in efforts by the public sector to identify future research needs, estimate future demand for scientific and technical manpower, and define appropriate, complementary roles and responsibilities for the various sectors and institutions involved in science for agriculture. Mechanisms should be developed for strengthening linkages between the findings of basic and applied research performed in the public sector and their development and commercialization by industry.³⁹⁴

The situation of the international research institutes, organized under the head organization Consultative Group on International Agricultural Research (CGIAR), resembled the situation of US land-grant universities. Their ability was limited to maintain successful conventional breeding programs, much less expand their efforts to the field of biotechnology in the context of financial austerity in the 1970s.³⁹⁵ Other than their private competitors, public research institutions were not able to take a share of the surplus their new varieties had generated, as their varieties were available as public goods mostly. Researchers estimated the value of the increased supplies of rice generated by high-yielding varieties based on IRRI germplasm to exceed US\$ 2.5 billion.³⁹⁶ However, this economic value was not used to reinvest in agricultural research.

Environmental sociologist Jack Kloppenburg and economist Martin Kenney, early and oft-quoted critics of patents on seed, described the role of the seed in the Gene Revolution as a nexus of control over the determination and shape of the production process in agriculture.³⁹⁷ Hence, through the changing legislation of intellectual property rights on seed in the 1970s and

³⁹⁴ The Rockefeller Foundation and The Office of Science and Technology Policy, *Science for Agriculture: Report of a Workshop on Critical Issues in American Agriculture* (New York: The Rockefeller Foundation, 1982), 26.

³⁹⁵ Donald L. Plucknett, Nigel J. H. Smith, "Agricultural Research and Third World Food Production," *Science* 217, no. 4556 (1982): 215–220, 212; Frederick H. Buttel, Martin Kenney, Jack Kloppenburg, "From Green Revolution to Biorevolution. Some Observations on the Changing Technological Bases of Economic Transformation in the Third World," *Economic Development and Cultural Change* 1, no. 34, (1985): 31–55.

³⁹⁶ Donald L. Plucknett, Nigel J. H. Smith, "Agricultural Research and Third World Food Production."

³⁹⁷ Jack Kloppenburg, Martin Kenney, "Biotechnology, Seeds, and the Restructuring of Agriculture."

1980s, the bundling of the Green Revolution package in corporate hands, multinational corporations gained significantly more influence on the way the agricultural process was designed and executed. With seed research in the hands of corporate actors, and the possibility of corporations to combine different parts of the Green Revolution package, corporate actors gained primacy in the design of agricultural technologies.³⁹⁸ In comparison, public research was soon marginalized and the design of (potentially environment-friendly) technologies to secure long-term global food production shifted into the hands of a few profit-oriented actors.

CONCLUSION

RESTORATION AND EXPANSION OF THE INFLUENCE OF MULTINATIONAL COMPANIES ON RURAL DEVELOPMENT POLICY IN THE 1970S

Above, I showed how multinational companies adapted to the more confrontational and regulative agenda: the inequity-causing and environmentally-damaging technology-driven approach of the Green Revolution was opposed by leftist and anti-globalist critics as well as environmentalists who criticized this strategy for sometimes-diverging, sometimes-overlapping, motives.³⁹⁹ This led to a complex back and forth in the international development cooperation. In the following, I present the larger debates in rural development and show how multinational corporations increasingly profited from liberal ideas of development cooperation. Consequently, multinational corporations emerged stronger from the crisis of the early 1970s and took a key role in rural development from the 1980s.

The criticism of multinational corporations in the late 1960s and early 1970s did not remain unanswered by their home governments, who protected their national corporations and advocated to expand their activities in a free market economy. For example, before the Chamber of Commerce in Britain, George Ball, a US official of the State Department, argued in favor of weakening national boundaries as these only “impede the fulfillment of world’s corporation’s full potentials as the best means yet devised for using world resources according to criterion of

³⁹⁸ More research would need to be conducted on how governments and multinational corporations communicated the changes in seed research and how public research institutes positioned themselves.

³⁹⁹ Corinna Unger, *International Development*, 127.

profit which is an objective standard of efficiency.”⁴⁰⁰ However, especially in this role as efficient provider of ill-adapted technologies expanding to their business activities to so-called developing countries, multinational corporations came under fire. They represented the technology-centrist, top-down approaches of earlier years that came to be known as the Green Revolution in rural development discourses. Although the Green Revolution triggered agronomic changes, leading to significantly higher yields, especially in India, international development experts observed that the Green Revolution also increased income inequality in rural areas.

Critics said the Green Revolution benefited only a small part of the rural population, only those farmers who were already better off, who had access to irrigation water and larger plots of land. In their view, the spread of Green Revolution technologies did not provide a panacea for equity and employment problems but served as a vehicle to widen income disparities within and between regions.⁴⁰¹ These criticisms excluded the role of multinational corporations. Only in the course of the 1970s, leftist critiques and environmentalists pointed to the critical role of multinational corporations in the Green Revolution. Marxist economist Harry M. Cleaver and economist Kenneth Dahlberg interpreted the Green Revolution as a strategy of US imperialism to integrate the agricultural sector into the capitalist market with the goal to create outlets for agribusiness products of US corporations.⁴⁰² Environmentalists pointed to the second generation problems such as the spread of diseases in monoculture cultivation, soil salinization through fertilizer use, and the detrimental health effects of plant control chemicals of Green Revolution technologies; problems created through the products of multinational corporations. In the 1980s, with the publications of environmentalist Vandana Shiva, the understanding that multinational corporations were responsible for second-generation problems solidified. Hence, in the course

⁴⁰⁰ George Ball, as quoted in: Vente Oliveiro, “The United States, Multinational Enterprises, and the Politics of Globalization,” 143.

⁴⁰¹ A good summary of early criticisms was presented by: W. P. Falcon, “The Green Revolution: Generations of problems,” *American Journal of Agricultural Economics*, 52, no. 5 (1970): 698–712.

⁴⁰² Cleaver, “Contradictions of the Green Revolution;” Cleaver, “The origins of the Green Revolution;” Dahlberg, “Beyond the Green Revolution.”

of the 1970s, the role of multinationals in the Green Revolution came to the forefront: critics looked at the negative environmental impacts of their products and their role as actors of US imperialism.⁴⁰³

Designers of the Green Revolution were predominantly interested in the large statistical and economic categories of supply and demand, productivity gains and growth by the means of science and technology. By contrast, rural development strategies in the 1970s turned to the individual and living conditions in rural areas—focusing on those who were not able to profit from the (technological) modernization processes. As the Green Revolution led to a massive land fleet that caused social and economic problems in the cities, the interest of policy-makers and funding for rural development increased—also to keep people on the land. This is reflected in the integrated development strategies of the World Bank, whose funding for rural development almost quadrupled between 1969 and 1974. Integrated development strategies stressed that rural development—under the condition of increasing agricultural and economic productivity—should also be directed to improving health, education, and other social services in order to enhance rural living standards.

With the introduction of their own *Integrated Rural Development Programme* (1978), the attention of Indian rural development policy-makers shifted remarkably to individual needs. Martha Nussbaum and Amartya Sen's philosophy informed this approach, which understood development as a process that enhances the capabilities of individuals to live the lives they desire to live. All individuals were to have the same access to development—regardless of their religion, gender, geographical background, or social status.⁴⁰⁴ Development approaches like the Green Revolution juxtaposed this strategy. It privileged the already better-off farmers, focused on abstract economic criteria, and its technology harmed the health of the farmer and the environment. However, integrated development and the basic needs approach, which focused on the individual, made rural development more and more fragmented and expensive.

⁴⁰³ Shiva, "The violence of the Green Revolution."

⁴⁰⁴ Corinna Unger, *International Development*, 139–141.

Unlike the Green Revolution, statistical indicators did not make big leaps, and due to the high costs and perceived ineffectiveness of these development approaches, market-oriented development policy-makers criticized these approaches. Thus, market-based approaches gained popularity and challenged the strong role of the state in development. In the debt crisis of the 1970s, governments and state institutions lost their credibility as efficient agents of change; the trust in state institutions waned.

The debates on economic development soon shifted from a focus on the freedom of the individual to the freedom of the market. The often-quoted and influential economist of the second half of the twentieth century, Milton Friedman, warned against too much regulation in *Capitalism and Freedom* (1962) and argued that economic freedom is as important as civic freedom. In case you lost economic freedom, it were only a matter of time before you lost the other.⁴⁰⁵ The hegemonic understanding of the economic system changed the relation of states and markets. Free markets with companies as their most effective actors were believed to bring about the optimum allocation of resources. With the so-called Washington consensus in the 1980s, liberal ideas promoting free markets and trade as the key to economic growth as indicator of progress became hegemonic. Chapter 2 showed that liberal ideas of the superiority of private companies as economic actors and free markets as efficient instruments to trigger economic development were already promoted in earlier efforts for rural development. However, before the 1980s, the liberal voice was one among many and state institutions played the key role in development. With the debt crisis of the 1970s, the trust in state institutions diminished and more and more responsibilities shifted to the private sector. Therefore, public-private partnerships similar to the Bimas Gotong Royong project in Indonesia increased rapidly in the late 1970s and 1980s. The conviction prevailed that companies were the more effective and competent actors in development cooperation. Not only did development policy-makers like the United Nations trust that the cooperation with companies cut costs, but also that they acted more

⁴⁰⁵ Milton Friedman, *Capitalism and Freedom*, (Chicago: Chicago University Press, 1962).

CHAPTER V

effectively on the ground and closer to the problems of individuals than the large and vested bureaucracies of state apparatuses.⁴⁰⁶

Until the 1980s, the central problems of development cooperation had hardly improved: poverty, hunger, and malnutrition prevailed, while the global economic structure had not changed—the income and wealth gap between the Global North and South remained wide. Furthermore, the optimism of the 1960s to be able to make a significant contribution to improve the well-being of humankind with the means of development aid and the hope of the G-77 to change the international economic system to their favor had evaporated. The dilemma—as discussed by Paddock and Borlaug—from the necessity of (potentially harmful) economic development and the ecological limits of the planet seemed insoluble.

From the Green Revolution of the 1960s and 1970s to the Gene Revolution of the 1980s, multinational corporations grew in significance as technological experts. Public-funded research became marginalized in comparison to the research budgets of rapidly growing agribusiness corporations. However, as in rural development, the research agenda of multinational corporations had one focus: profits. Other than publicly or philanthropically funded research institutes, their research agenda marginalized philanthropic or development goals. Hence, their focus was on large-scale farming in the Global North, and technologies for small-scale farmers in the Global South were, if at all, a secondary concern.

In 1987, the Brundtland report introduced the concept of “sustainability” to the development arena and stressed that the needs of the present were not to compromise the potential of future generations to meet theirs.⁴⁰⁷ With all these seemingly insurmountable challenges ahead, development policy-makers turned again to the potential of technology, this time, to overcome scarcity and to reduce the damages of industrial development on the environment. Again, technology was held up as a cure with the potential to align social, economic, and political development goals. In agricultural development, research and expertise, however, had mostly

⁴⁰⁶ Corinna Unger, *International Development*, 146.

⁴⁰⁷ *Ibid.*, 148.

GAINING INFLUENCE FROM THE GREEN TO THE GENE REVOLUTION IN THE 1970S

shifted to the private sector during the Gene Revolution. Compared to research institutes of the Green Revolution and state-funded research institutes, the research budgets of multinational corporations skyrocketed and the impact of multinational corporations on technology transfer and the design of agricultural development strategies increased likewise. Multinational corporations had gained the control over the research agenda, which served the interest of the corporations and their stakeholders: to make profits.

CHAPTER VI

CONCLUSION

What started as an inquiry into the history of rural development soon turned into something much larger. Through the lens of multinational corporations, the Green Revolution was as much a development strategy as a business model to create markets for agricultural supplies; an opportunity for agrichemical corporations to tap new markets under the guise of development aid. The focus on multinational companies illuminates strong dependencies of rural and industrial development strategies in the Green Revolution and the trust of development policy-makers in market-based development approaches.

I found that the Green Revolution, understood as an approach to rural development involving the dissemination of a package of agricultural technologies, including high-yielding seed varieties, fertilizers, and plant protection chemicals, did not describe a single initiative or historical experience, but transcended geographical and political environments. In contrast, individual companies focused on specific countries in their market expansion. Often, the company's decision where to invest depended on the diplomatic relations of their home government to a so-called developing country. Hence, a company never acted independently, but was always bound to the support and regulations of other political actors of the Green Revolution. My research describes the networks, exchanges, and collaborations of multinational corporations with governments, international organizations, research institutes, and philanthropic foundations. Analyzing the role of multinational companies in the Green Revolution helped to explain how actors in the Green Revolution related to and depended on each other in the expansion of 'modern' agricultural technologies.

The power dynamics between the actors changed in the course of the Green Revolution: multinational companies were at first dependent on state support to find their place in the network of rural development actors. However, once they found their position, they expanded their sphere of influence in order to optimize profits in the framework of rural development policy-making. The lens of power dynamics illuminates the multitude of corporate experiences in the expansion of their business activities. In India, fertilizer and engineering companies experienced failed negotiations, bureaucratic challenges, and delays in the execution of their

projects. Some projects, such as the Ciba Bimas project in Indonesia, did not even yield profits. Yet in the course of the Green Revolution, multinational corporations were able to strengthen their ties in the rural development network, make contacts with government officials, and found subsidiaries in so-called development countries. Hence, multinational companies were not the powerful, determining colossi in rural development we observe today, but entered the sector only slowly and were dependent on a network of support in the development community.

In the 1960s and 1970s, the activities of multinational corporations multiplied across the globe. In the context of the Green Revolution, development aid funds and networks helped large corporations to reach difficult-to-access areas and risky markets in so-called developing countries. The corporations' products, such as fertilizers and plant protection chemicals, promised to increase agricultural productivity and thus became essential components of agricultural development programs. Multinational corporations did not necessarily need to be visible on the ground. Their ideas and goals found their way into the formulation of rural development concepts and the connection of development goals to foreign economic motives, especially the idea that development projects necessarily need to make a profit.

SUMMARY

This dissertation examines the different parts of the Green Revolution package in turn: seed business in chapter 2, fertilizer industry and plant engineering in chapter 3, and plant protection chemicals in chapter 4. This allows me to differentiate diverging power dynamics in rural development initiatives. It helps to make an important differentiation between industries and to discuss their marketing goals, production patterns, and strategic goals separately. What can be said about all sectors is that the participation of multinational corporations in the Green Revolution increasingly turned rural development into a process of commercialization. This process continued in the 1970s with the privatization of seeds and their adaptation to chemical plant protection in the Gene Revolution, which I discuss in chapter 5.

The second chapter, *Sowing the Green Revolution*, scrutinizes the involvement of the seed industry in the Green Revolution in India in the late 1950s and early 1960s. In this time, the strategy of the Rockefeller Foundation in increasing India's food production did not rely on wheat but on maize. Rockefeller officials supported a comparably small initiative for maize

CHAPTER VI

hybrids in India. The analysis of this initiative provides insights about the attitude of the Rockefeller Foundation toward US private businesses in development initiatives: the chapter discusses the close ties between the US government, corporations, and philanthropic actors in agricultural development initiatives in India. It takes the example of the US seed company DeKalb, which depended on the support of the US and the Indian government, as well as the Rockefeller Foundation, to establish its seed business in India.

The success of the initiative was limited. Maize was not an important food crop in India, compared to rice and wheat. Furthermore, the capital structure of most Indian farmers was not suitable for a seed that farmers had to buy anew every year. Nonetheless, the story of maize in the Green Revolution and the government-corporate-philanthropic cooperation offered answers to a number of questions: What expectations did companies like DeKalb have when they expanded their activities into developing countries? How did the US government support the expansion of US companies to markets of so-called developing countries? In addition, what was the relationship between the Rockefeller Foundation's employees and private sector actors?

The Rockefeller Foundation promoted hybrid maize because its officials trusted in the efficiency of the collaboration with US seed businesses to achieve their aims of rising Indian food production. In the late 1950s, private seed corporations were the cornerstones of their seed development programs. The employees of the Rockefeller Foundation promoted processes of the commodification of seed (i.e., processes of turning a public good, shared freely among farmers, into a good traded commercially on the market). This included the promotion of certification standards and procedures. The Rockefeller Foundation considered the commodification of seed as an adequate means to raise the interest and private investments of US companies in the Indian market.

DeKalb entered the Indian seed market only very hesitantly—it relied on and needed the support of the Rockefeller Foundation and US AID to secure its activities against the risk of losses following market expansion. Furthermore, DeKalb was dependent on the Rockefeller Foundation to set up contacts with the Indian government and to receive an orientation in India and on the Indian market. In collaboration with the National Seed Corporation, a seed multiplication company initiated by the Rockefeller Foundation, DeKalb invested in the seed business in India in the early 1960s. The head of DeKalb's operations, Rus Rasmusen, stressed

the motive of increasing Indian food production and the humanitarian intention of his company in its expansion to the Indian market.

When Rasmusen, who had strongly supported the operation, died suddenly in 1964, the whole operation fell into jeopardy and DeKalb threatened to pull out of business. Other than Rasmusen, DeKalb's other executives were concerned about the low sales of their company in India. DeKalb's threat to stop the entire operation took the Rockefeller Foundation and US AID by surprise; both aimed to prove that US businesses were reliable partners in development projects and feared to lose their reputation. Consequently, in order to secure the success of their program, they offered funding and negotiated better conditions for DeKalb with the Indian government. Because of these negotiations, DeKalb stayed in India and continued in the business of seed multiplication.

DeKalb's experiences in India showed that, on the one hand, even if an agribusiness company was ready to work with projects on a break-even basis or even absorb losses in the initial years, in the end, investments had to be profitable. On the other hand, it showed that although DeKalb was dependent on the Rockefeller Foundation to set up its operations in India, the company quickly turned the game around as soon as it had established some market dominance and pressured the Rockefeller Foundation and US AID to secure a better deal for its market expansion.

In chapter three, *Fertilizing the Green Revolution*, I present the rapid development of the Indian fertilizer industry from 1955 to 1970. The chapter illuminates the power dynamics between private industry, the Indian government, and donor nations in the expansion of the Indian fertilizer industry. The construction of a fertilizer plant by the German engineering corporation Uhde, as part of the Rourkela steel works from 1955 to 1963, highlights the limitations and opportunities of Uhde's market expansion created through development aid funds. The terms of funding through means of West German development aid were part of the considerations of the Indian government when choosing for or against a corporate offer. Uhde lost the Nangal tender due to a lack of support of the West German government and unfavorable currency exchange rates, but won the Rourkela tender due to its linkages to the West German prestige development project, the construction of Rourkela steel works. Consequently, engineering companies were

CHAPTER VI

equally dependent on the development aid framework of their home government as on macroeconomic policies concerning exchange rates to secure a deal with the Indian government.

In the case of the Bechtel consortium, neither financial incentives nor the strong political pressure of the US government was enough to initiate a large-scale construction project for five fertilizer factories in India. The demands of the companies went too far, and the Indian government refused to give in on issues of political and economic self-determination. As a result, the consortium withdrew its offer. This shows that development projects in the fertilizer industry were realized only when the interests of the Indian government, donor governments, and foreign corporations converged. Yet, it was precisely in the expansion of the Indian fertilizer industry that the triangle of actors promoted similar ideas. Foreign corporations were interested in building new factories and exporting fertilizers. Governments of donor countries promoted fertilizers as the cure to the Indian food problem, and the Indian government was willing to invest heavily in the expansion of its fertilizer capacities to expand its food production; however, only under the terms of the Indian government.

The expansion of the Indian fertilizer industry shows that donor nations did not pressure the Indian governments into the construction of factories as a development project. Rather, due to the multiplicity of donor nations, the Indian government had room to maneuver and choose the most favorable package: it took into consideration the price offer of the company as well as development funds provided by the home government. Another criterion was the technical expertise that Indian engineers could acquire in order to learn from factory construction processes for the future. The technological spillover effects were important for the Indian government as it planned to execute large-scale engineering projects, using only Indian companies and expertise. This was important in a situation of scarce foreign exchange.

Chapter three highlights the interdependence of rural and industrial development in the Green Revolution. Not only did the agricultural sector need the industrial input (i.e. fertilizer) to grow, the industrial sector also needed cheap food supplies to feed the industrial workforce. Furthermore, in the Green Revolution, the Indian government thought of rural development in an industrial logic. For example, the Minister for Food and Agriculture, Chidambaram Subramaniam, framed his agricultural and rural development policies in terms of industrial doctrines. Just as Subramaniam had aimed to increase industrial production in factories when

he was Minister for Industry and Steel, so he planned to increase the productivity of fields through market incentives and the massive use of fertilizers. From this perspective, productivity increases took precedence over poverty reduction goals.

Chapter four, *Diffusing Pesticides*, brings the dissemination of plant chemicals into focus. In order to promote the usage of their plant chemicals, multinational corporations organized themselves in institutionalized lobby efforts on the national and international level. They found support from development actors such as US AID or the FAO that struggled to increase food production in the context of rapid population growth. They shared technocratic ideas about rural development and found in multinational companies the ideal partners to bring ‘modern’ agricultural technologies to the rural areas of the Global South.

The Food and Agriculture Organization (FAO), in particular, saw the involvement of multinational companies as an opportunity to use the financial and managerial skills of multinational corporations for its own purposes and to expand its own room for maneuver. However, the ICP, the FAO’s Industry Cooperative Programme, only realized a few projects because the FAO approach did not seem lucrative enough to many business representatives. Multinational companies did not want to be treated as a collective; instead, each company demanded preferential treatment.

With its lack of financial resources, the FAO was not an interesting partner for the companies in the end. Although the collaboration with the FAO was prestigious for executives of multinational corporations, the limited the scope of FAO’s development initiatives on the ground did not yield enough profit potential for a long-term cooperation. In the design of the program, the FAO had simply overestimated the companies’ willingness to invest in and take risks for the causes of rural development. In the last phase of the program, the companies were rather more interested in the information about input consumption patterns and the contact with government officials that the FAO could provide than taking any kind of financial or managerial responsibility. Underfunded in its mission in the ‘fight against hunger’, the FAO was confronted with multinational companies that looked for a financial back up through development funds. Consequently, common efforts were hindered by the lack of funds (FAO) and an unwillingness to invest (multinational companies).

CHAPTER VI

In the third part of the chapter, the Indonesian government took the risk of the investments in rural development. In the Bimas Gotong Royong project, a public-private partnership in the dissemination of plant protection chemicals, it seemed advantageous for the Indonesian government under Suharto to cooperate with multinational companies to increase Indonesian production of rice. Ciba's aerial spraying methods promised rapid 'modernization' without the complexity of reaching every farmer in time-consuming extension work through the government. In view of the Indonesian government, the centralized organization of crop protection by a multinational company would ensure the correct application of plant protection chemicals. In the execution of the project, Ciba and the Indonesian military worked closely together to distribute inputs such as fertilizer. Without the help of the Indonesian government, it would have been difficult for Ciba to reach the rural market.

Ciba had not established a sales network in this region with spread-out villages and low levels of capitalization. Thus, it was beneficial for the company to be able to sell large quantities of its product in bulk to the government. The government collected the credit repayment on behalf of the corporation. In this fragmented, small-scale rice cultivation sector, it was helpful for Ciba that the government enforced the crop protection program and the company did not need to negotiate with individual farmers. However, the cooperation and timing with farmers in the planting cycle turned out to be difficult for Ciba. As a result, yields did not increase as expected. Consequently, the government had to carry the losses and ended the program earlier than planned, although Ciba would have liked to extend the project to other parts of the country beyond Java.

The 'profits' Ciba made ended up being rather indirect. Ciba had a good story for Public Relations, presenting itself as a helpful corporation, being active in development aid. Furthermore, it had good relations with the Suharto government, which allowed Ciba to set up pharmaceutical factories. However, while Ciba provided the technology and the expertise in the Bimas Gotong Royong project, the Suharto government decided terms of the execution, duration, and funding of the project.

Chapter five, *From the Green to the Gene Revolution*, examines the criticism of multinational corporations during the Green Revolution and analyzes the reactions of multinational companies in the course of the 1970s. At the end of the 1960s and beginning of the 1970s, multinational

companies were increasingly subject to vehement criticism: particularly because crop protection chemicals damaged ecosystems and the health of the rural population. Popular outrage at the fact that companies appeared to profit at the expense of farmers' health was considerable. Critics were also concerned about the increases in company activities across borders, fearing that multinational companies would operate outside state sovereignty. As the public outrage resulted in the expansion of regulative regimes, especially environmental regulations, multinational corporations had to reposition themselves.

The dynamics of the 1970s make visible that multinational companies could not act as boundless colossi, but that their activities were under the critical scrutiny of the public and could potentially be restricted by an international ban of their products. Multinational companies used the established lobbying structures presented in chapter four to avoid a ban of their agrichemicals and invested in PR campaigns to change their public image. In these campaigns, it was common among multinational companies to use the 'fight against hunger' as a rhetorical tool. They hailed their fertilizers and crop protection chemicals as indispensable tools in the effort to expand food production. The message companies wanted to deliver was clear: without us, you cannot win the 'fight against hunger.' The companies were not sure whether these PR strategies would be enough, and chemical companies such as Ciba began to invest in a new field of business: biotechnology and seed research. Biotechnological advances in the 1970s and changing intellectual property rights for plants and their parts initiated the shift from the Green Revolution to the Gene Revolution in the late 1970s. The shift from the Green Revolution to the Gene Revolution was a shift from a public-based strategy in seed research to a strategy targeting private profits.⁴⁰⁸

Changing attitudes toward the state favored the rise of private actors in agricultural research in the 1970s and 1980s: in the context of the oil crisis of 1973, the slow-down of economies in the Global North, and the limited success of development approaches that relied on state

⁴⁰⁸ Frederick H. Buttel, Martin Kenney, Jack Kloppenburg, "From Green Revolution to Biorevolution: Some Observations on the Changing Technological Bases of Economic Transformation in the Third World"; Govindan Parayil, "Mapping technological trajectories of the Green Revolution and the Gene Revolution from modernization to globalization," *Research Policy*, 32, no. 6 (2003), 973.

institutions, liberals questioned the efficacy of the state and its institutions. Proponents of privatization of state responsibilities got a bigger say in rural development policy-making and increasingly portrayed multinational corporations as more efficient in agricultural research and technological change. Multinational corporations could use their ties in so-called developing countries, created during the Green Revolution, to further expand their sphere of influence.

CONTINUITIES IN APPROACHES TO RURAL DEVELOPMENT

With agriculture as the largest source of income, rural development is strongly intertwined with issues of agricultural development. Hence, most strategies of rural development targeted increases in agricultural productivity. However, in the Green Revolution of the 1960s and 1970s, the aim to increase agricultural productivity became an almost singular goal. Other goals of rural development, such as health, hygiene, education, and a balanced community, shifted to the background. Productivity goals replaced concerns about social inequality.

Rural development policies often emerged from previous approaches, especially institutionally. In India, for example, the Green Revolution utilized seed farms and educational institutions that were founded in community development projects (chapter 2). When the shortcomings of the Green Revolution—increases in economic inequalities and the aggravation of social conflicts—became evident, policy-makers returned to approaches such as Integrated Rural Development that were more similar to Community Development, in that they targeted rural poverty multidimensionally. This time, however, the approach focused on the individual, and not the community. In the 1980s, (neo-) liberal ideas of development with a strong emphasis on free markets and farmers as economic actors became hegemonic; these ideas had already partly informed earlier approaches to rural development such as the Green Revolution. Hence, ideas of rural development are continuous and vary in strength and pronunciation in the different approaches.

This becomes particularly clear in the example of liberal ideas, which informed Green Revolution policies before they finally became hegemonic in development discourses in the 1980s. Liberal arguments and ideas of commercialization had been influencing development discourses for decades. For example, in the early 1960s, in the introduction of hybrid seeds to India (chapter 2), the Rockefeller Foundation promoted ‘free markets’ as the most effective

means for distributing new varieties. Furthermore, Indian rural policy-makers, such as Chadambariam, increasingly understood the peasant as an economic actor who reacts to price incentives and who makes economically rational decisions (chapter 3). Consequently, it was only logical for them to design rural development policies based on improving market conditions for the sale of harvests and the purchase of agricultural inputs. However, this focus on markets did not necessarily lead to balancing existing inequalities, because market participants did not have the same starting conditions—e.g. richer farmers had better access to credits and multinational corporations had closer ties to government bodies and funding institutions, as discussed below.

THE GREEN REVOLUTION THROUGH A CORPORATE LENS

Most historians describe the Green Revolution as a technocratic approach to rural development, an approach that trusted in technologies to overcome social problems, such as poverty. This approach had a strong productivist focus, which enabled increases in yields but failed to overcome existing wealth and income inequalities. In addition to the technocratic and productivist dimension of the Green Revolution, my research suggests to understand the Green Revolution also as a ‘commercial’ approach to rural development, strongly interlinked with industrial development ideas. Understanding the Green Revolution as a commercial approach stresses the promoted market-oriented structures and institutions. In the Green Revolution, productivist, technocratic, and commercial elements combined to form a strategy that sought to bring progress and to raise productivity through the provision of agricultural technologies, pricing mechanisms, and the creation of markets. This market-based, productivity-centered approach to rural development opened the door for multinational corporations to play a more determinant role in rural development.

In a recent paper, Jonathan Harwood raised an essential question for our understanding of the Green Revolution: was commercialization *aim* or *consequence* of the Green Revolution? Proponents of the *consequence*-thesis, such as Vandana Shiva, understand commercialization to be a side effect of the Green Revolution, a political or cultural cost. Supporters of the *aim*-thesis, as outlined by Marxist economist Harry Cleaver, understand strategies of

CHAPTER VI

commodification to be central to the Green Revolution, and see the Green Revolution as a commitment to a more entrepreneurial mode of production.⁴⁰⁹

My research suggests that commercialization was an aim of the Green Revolution: the promotion of markets was inherent all rural development strategies I examined in this dissertation. From my perspective, the Cold War setting made it more likely for US American development actors such as US AID or the Rockefeller Foundation to actively promote capitalist development. The DeKalb case in India showed that Rockefeller officials trusted in markets as best allocation mechanisms and multinational companies as most efficient actors in the promotion of new technologies. In this case, the Rockefeller Foundation promoted commercialization to introduce hybrid maize varieties in India. For Rockefeller officials, commercialization appeared to be the most promising strategy to disseminate the package of technologies to increase total food production. For me, however, it is also important to stress that Rockefeller officials' final aim was to increase overall food production; commercialization might have been a *means* to a humanitarian end.

What appears even more important to me as a finding is that through the corporate lens chosen in this dissertation, the distinction of rural and industrial development became blurred. Agricultural planners relied on chemical fertilizers in the 'fight against hunger' and estimated their impact in simplified and abstract models. This lens changed the way they made rural development policies. Instead of focusing on the establishment of education or health systems, policy-makers focused on the construction of factories. This focus caused rural development to move away from human-centered approaches to an obsession with ensuring a sufficient supply of agricultural inputs.

MULTINATIONAL CORPORATIONS AND THE FREE MARKET

In my analysis, I found a paradoxical relation of multinational corporations and ideas of a free market economy in the Green Revolution. One might think that multinational companies were strong proponents of 'free markets' to promote and to disseminate their technologies in the

⁴⁰⁹ Jonathan Harwood, "Was the Green Revolution intended to maximise food production?," 1.

Green Revolution. Indeed, companies made use of ‘free markets’ as a rhetorical tool. However, I found that multinational companies might have rhetorically supported the ideal of a free market economy, but meanwhile they demanded strong state support. For example, companies such as DeKalb, Uhde, or Bechtel only invested in so-called developing countries when their national governments backed up or subsidized their investments.

The idea of a perfectly ‘free market’ is an illusion: markets only work because of a form of regulation, with the protection of private property in its most fundamental form. On all markets, market participants inhabit different degrees of power, i.e. different degrees of freedom. This is visible in market shares, purchasing power, or access to political institutions. Hence, the idea of a free market remains an ideal, a very powerful one.

With their ‘free market’ rhetoric, multinational companies demanded free access to the markets of so-called developing countries, such as India, and through political institutions such as US AID or the FAO were able to promote the abolition of protective measures, while meanwhile securing funds for the expansion of their markets. In the Green Revolution, multinational companies were close to rural development policy-makers. Other than farmers or cooperatives in so-called developing countries, companies attended meetings of the Food and Agriculture Organization from 1965 onward (chapter 4) and the World Food Conference of the United Nations in 1974 (chapter 5). The US government supported the Bechtel consortium (chapter 3) in the early 1960s, the Agribusiness Council (chapter 4) from the late 1960s onward and created investment opportunities and funding for multinational companies from the Point Four program in 1949 onward. Through all these bodies, multinational corporations had good access to rural development policy-making and could secure subsidies and funding opportunities. Consequently, in the allocation of development aid funds, multinational companies were favored over smaller market participants.

MUTUAL DEPENDENCIES OF RURAL DEVELOPMENT ACTORS IN THE GREEN REVOLUTION

Multinational corporations had two strong rhetorical tools: ‘free market’ rhetoric to secure access to markets of so-called developing countries and the ‘fight against hunger’ to promote their technologies in rural development initiatives. Observing rapid population growth, the ‘fight against hunger’ caught public attention in the 1960s. In the discourse, corporations presented

CHAPTER VI

their technologies as a cure to feed growing populations. Although multinational corporations stressed this altruistic goal, I found that the maxim of making profits gave a limit to this corporate altruism. Some corporate leaders such as the economic analyst and President of the Business International Corporation, Eldridge Haynes, gave this dualistic motivation of industry an analytical framework. He spoke of an “enlightened self-interest” in participating in development aid:

The motivation [of private industry] is dualistic. Industry is of necessity interested in profits. But it is also concerned with ameliorating the conditions of starvation and malnutrition, which exist in so many areas. It realizes of course, that improvements in income throughout the world, which will result from a larger supply of food products and a higher standard of living, will create a larger demand for industry’s products. It is, on balance, neither completely self-centered nor completely selfless. It looks to the private enterprise system to supply the demand for the supply it can produce. It looks to national governments of the developed countries to offer realistic assistance in guaranteeing its investment and a distribution system through which it can market its goods. It looks to one or both for capital backing for its proposed investment and for accurate feasibility studies.⁴¹⁰

Eldridge stressed the necessity of governmental support for corporate activities—the need for partnerships: Private actors offered the supply of agricultural inputs needed for rural transformation processes. Governments supplied funding and secured risks of the market expansion. Hence, they were mutually dependent. However, these public-private partnerships were financially unbalanced. While corporations were entering the sphere of rural development with the precondition of profitability, others had to pay for the prerequisites of their market entry such as infrastructure, irrigation, and education. While one partner, ‘the corporation,’ aimed to benefit financially from rural and agricultural development, the other partners, such as governments and international organizations, had to bear the burden of costs involved. For example, in the Bimas project, Ciba supplied and applied plant protection chemicals, but was dependent on the support of the military and state officials to enforce its rice improvement

⁴¹⁰ Report titled “ Special Report: Action by Industry to combat the World Food Problem” by Eldridge Haynes, President, Business International Corporation, 1966-06-16, Folder 9, Box 44, Collection PR, FAO Archives, Rome.

scheme. Furthermore, the Indonesian government carried the financial losses of the project (chapter 4).

The Indian government was very skillful in establishing a setting for the construction of fertilizer factories that facilitated the training of Indian engineers and a technology transfer that made them independent of foreign engineers for future projects. Similarly, in response to the Bechtel consortium, it enforced its own ideas of fertilizer development, despite strong political pressures exerted by the US government (chapter 3). This shows that governments of so-called developing countries, on the one hand, were interested in collaborating and profiting from the technological know-how of multinational corporations, yet, on the other, had the ability to oppose foreign development schemes, or to adapt them according to their own preferences.

Philanthropic foundations, governments, and international organizations promoted businesses by establishing networks, securing risks, and favoring a technocratic strategy for rural development. For their market entry, multinational companies were dependent on this support. Corporate executives were confronted with bureaucratic challenges, infrastructural problems, and language and cultural barriers, which made market entry difficult (chapters 2, 3, 4). The images circulating today of multinational corporations as invaders stretching their octopus tentacles around the globe are by no means typical of the experiences of corporate executives in the Green Revolution. Thus, the assumption that multinational companies operated with superior power in so-called developing countries (which imperialist theories suggest) and spread their business without resistance is not accurate. Rather, multinational companies profited from strong partnerships with and the support of governments, especially in the context of rural development aid.

CRITICAL ASSESSMENT

This dissertation attempts to fill a gap in historical research on the Green Revolution: seeing it through the lens of multinational companies. It sheds light on several industries and presents insights on the broad range of companies involved and their partnerships with political actors. These are some of the strengths of this work. However, the fragmented source material did not allow me to analyze comprehensively the multitude of participating companies or regions affected by the Green Revolution. The result is a lack of a ‘full picture.’ However, I provide

CHAPTER VI

several pieces of the puzzle of corporate involvement in rural development that I aim to complete with further-reaching work in the future.

Understanding multinational corporations as part of the development community revealed the strong interrelations of overseas investment strategies and development aid in the 1960s and 1970s. My approach of combining business history with the history of development allowed for a better understanding of the commercial goals of development aid. For example, it allowed for an analysis of the commercial dimension of the Green Revolution. In future research, it promises further reaching insights about the cooperation of private businesses and governments in the realm of development. This research might further stress the commercial motives that informed rural development policies and investment decisions, and highlight the role of networks in the realization of projects.

The case studies presented in this dissertation have one major shortcoming: they lack a local perspective. As I told my histories of rural development through the lens of multinational corporations, international organizations, or philanthropic foundations, I was not able to include the perspective of local farmers. Yet, it would make the narratives more meaningful if farmers were to speak of the changes they experienced; how they perceived the emergence of multinational companies in their villages and small towns; and how all of this changed their lives. Unfortunately, the archival material in the headquarters of the corporations I studied could not allow for insights to these questions, which require further research on the ground.

By including European companies in the history of the Green Revolution, this dissertation successfully broadened the understanding beyond a US foreign policy strategy to rural development. However, it was often much more difficult to contextualize company activities as European scholarship has paid little attention to the history of development, especially in business and environmental history. It was difficult to find out how multinational companies influenced the environmental discourse and which influence corporate actors had on environmental regulations in the 1960s and 1970s. Further research should therefore focus more intensively on the influence of multinational corporations on environmental regulations and their position in the environmental discourses in Europe during the 1960s and 1970s.

I was able to identify a multitude of lobbyist activities and bodies in the context of the Green Revolution and development aid. Unfortunately, I did not find enough archival material to analyze the content of meetings or the initiated policies in sufficient detail. In my future research, I plan to analyze meetings of the Agribusiness Council or the National Advisory Committees and the impact of projects that resulted from these meetings. Through these analyses, I aim to find out more about how commercial ideas influenced rural development policy-making.

The activities of multinational corporations tend to be less visible in diplomatic, transnational, and even economic history than the activities of governments, international institutions, or philanthropic foundations. Certainly, this invisibility results from the inaccessibility of many corporate archives. These archival obstacles create challenges to understand the rapid emergence of multinational corporations in the second half of the 20th century, which needs further historical investigation. Without this research, the perception prevails that multinational corporations acted and continue to act outside of state regulation and control. However, the history of multinational companies in the Green Revolution presents multinational corporations as actors that are dependent on government support and the economic system in place. Multinational companies did not necessarily act outside of a political controllable sphere. This insight allows us to understand multinational companies as part of the economic and political system in place, instead of understanding them as uncontrollable colossi operating outside of the political sphere. Hence, if the impression dominates today that multinational companies are overly powerful, political measures can be taken to limit their sphere of influence and room for maneuver.

OUTLOOK

What goal does rural development have? Increasing the incomes of the rural population? Strengthening community or democracy in rural areas? Improving health conditions and access to medical services? Fighting rural poverty? Increasing food production through modern technologies to fight hunger? All these policy goals seem to be worthwhile. However, focusing on only one goal, as in the Green Revolution, necessarily neglects another.

CHAPTER VI

Sometimes history threatens to repeat itself. In 2004, former UN Secretary-General Kofi Annan called upon African farmers to wage a “uniquely African Green Revolution.”⁴¹¹ In the Alliance for an African Green Revolution (AGRA), the philanthropic Bill and Melinda Gates Foundation, with Kofi Annan as founding chair, designed a strategy to follow his lead and to recreate the Green Revolution in Africa. Their mission is “to fulfill the vision that Africa can feed itself and the world—transforming agriculture from a solitary struggle to survive to business that thrives.”⁴¹² Hence, the idea of agriculture as a business is inherent to their vision. The initiative promotes markets, access to credits, agricultural inputs, high-yielding seed varieties, and an image of the cultivator as an agricultural entrepreneur—almost the same as the prototype of the Green Revolution of the 1960s and 1970s. Multinational corporations, such as the Norwegian fertilizer manufacturer, Yara, and the Swiss Syngenta Foundation for Sustainable Agriculture, support this initiative. In many respects, AGRA focuses on creating markets and neglects structural elements that continue to be at the core of rural poverty: inequality and a lack of access to education and health services.

In this development initiative, technocratic and commercial visions of development repeat themselves. Yet the agricultural research and development world has changed. Multinational corporations account now for a larger share of overall spending on agricultural research than do public institutions. As Syngenta’s Golden Rice initiative shows, modern agricultural technologies have the capability to do wonderful things, like adding Vitamin A to a rice seed. However, such research only happens on the margins and the main part of research focuses on the more profitable agriculture in the Global North, not on smallholder farming. Furthermore, similar to the Green Revolution of the 1960s and 1970s, despite the promises of modern

⁴¹¹ Kofi Annan, “Secretary-General Calls for “uniquely African Green Revolution” in 21 Century, to end continent’s plague of hunger, in Addis Ababa remarks,” *UN Press Release* SM/9405, 07.06.2004, last accessed 12.29.2020: <https://www.un.org/press/en/2004/sgsm9405.doc.htm>.

⁴¹² AGRA, *What we do*, last accessed 12.29.2020: <https://agra.org/>.

technologies, the commercial focus of the ‘repeated’ Green Revolution potentially solidifies structural inequalities in place.⁴¹³

AGRA opens new markets for multinational companies and their technologies. It brings their technologies to Africa’s rural areas. This requires human resources, networks, and development funds. Alternatively, these resources could go to initiatives that target rural poverty from a grass roots and multidimensional perspective, that focus on education and health improvements. Instead, the resources foster commercialization.

Commercialization might promise benefits and efficiency. It might promise to increase productivity. But, it does not promise to change structural inequalities. Rather, it supports richer farmers with more land and thereby tends to solidify power structures already in place. Rural development, however, should focus on more dimensions than just the economic one: education could open opportunities; improving health systems could tackle prevalent diseases. Demanding changes in structural inequalities is still politically more difficult than supporting technological change. However, for bringing about meaningful change, almost 60 years after the Green Revolution, it is an essential supplement to the promotion of agricultural technologies.

⁴¹³ Philip Pardey and Nienke M. Beintema: *Slow Magic: Agricultural R&D a century after Mendel* (Washington, D.C.: Agricultural Science and Technology Indicators Initiative; International Food Policy Research Institute, 2001).

BIBLIOGRAPHY

PRIMARY LITERATURE

Alexis Rieffel. "The BIMAS Program for Self-Sufficiency in Rice Production." *Indonesia* 8 (1969): 103–33.

Baranski, Marci R. "Wide adaptation of Green Revolution wheat: international roots and the Indian context of a new plant breeding ideal, 1960-1970." *Studies in history and philosophy of biological and biomedical sciences* 50 (2015): 41–50.

Barnet, Richard J., and Ronald E. Müller. *Global Reach: The Power of the Multinational Corporations*. London: Cape, 1975.

Cleaver, Harry M. "The Contradictions of the Green Revolution." *The American Economic Review* 62 (1972): 177–86.

Cleaver, Harry M. *The Origins of the Green Revolution*. Ann Arbor: Microfilm Publishing, 1974.

Coward, Elisha Walter. "The subsistence to commercial transition in agricultural development." Doctoral Dissertation, Iowa State University, 1969.

Dahlberg, Kenneth A. *Beyond the Green Revolution: The Ecology and Politics of Global Agricultural Development*. New York, London: Plenum Press, 1979.

Ehrlich, Paul Ralph. *The Population Bomb*. Cutchogue, N.Y.: Buccaneer Books, 1971.

Falcon, Walter P. "The Green Revolution: Generations of Problems." *American Journal of Agricultural Economics* 52, no. 5 (1970): 698-710.

Feder, Ernest. "Die neue Penetration der Landwirtschaften der unterentwickelten Länder durch die Industrienationen und ihre multinationalen Konzerne." In *Multinationale Konzerne und Dritte Welt*. Edited by Dieter Senghaas, 103–28. Opladen: Westdeutscher Verlag, 1976.

Friedman, Milton, and Rose D. Friedman. *Capitalism and Freedom*. Chicago, London: University of Chicago Press, 1962 (2002).

Friedrich, Alexander Gunther, and Valence E. Gale. *Public-Private Partnership within the United Nations System: Now and Then*. Bielefeld: W. Bertelsmann Verlag, 2004.

Gaud, William S. "The Green Revolution: Accomplishments and Apprehensions." Accessed January 29, 2019. <http://www.agbioworld.org/biotech-info/topics/borlaug/borlaug-green.html>.

George, Susan. *How the other half dies: The real reasons for world hunger*. A pelican original. Harmondsworth: Penguin, 1976.

Gupta, Akhil. *Postcolonial Developments: Agriculture in the Making of Modern India*. Durham, N.C., London: Duke University Press, 1998.

BIBLIOGRAPHY

- Heredia, F. J. "From Distribution to Marketing." In *Development of Fertilisers in India: FAI, Silver Jubilee, 1955-1980, Commemorative Volume*. Edited by T. M. Alexander, 169-191. New Dehli, 1980.
- Indira Gandhi. "Science, Technology, and Self-Reliance: Inaugural Address to the Indian Science Congress." Indian Science Congress, Calcutta, 1985.
- International Rice Research Institute. *IR 8 and beyond*. Los Baños: International Rice Research Institute, 1977.
- Kohli, Atul. *The State and Poverty in India: The Politics of Reform*. Cambridge: Cambridge University Press, 1987.
- Ladejinsky, Wolf. "Agrarian Reform in Asia." *Foreign Affairs*, 1964, 758.
- Ladejinsky, Wolf. "Ironies of India's Green Revolution." *Foreign Affairs* 48, no. 4 (1970): 758.
- Lilienthal, David. "The Multinational Corporation." In *Management and Corporations*. Edited by Ashen Melvin and G.L. Bach. New York, N.Y.: McGraw-Hill, 1985.
- Malthus, and Thomas Robert. *An Essay on the Principles of Population*. Cambridge: Cambridge University Press, 1992[1798].
- Mark Dowie. "The corporate crime of the century." *Mother Jones*, 11.1979.
- Mukherjee, S. K. "Technological Developments in India's Fertiliser Industry." In *Development of Fertilisers in India: FAI, Silver Jubilee, 1955-1980, Commemorative Volume*. Edited by T. M. Alexander, 89-112. New Dehli, 1980.
- Narayanaswamy, P. K., and K. Pushparaj. "Impact of fertiliser industry on rural development." In *Development of Fertilisers in India: FAI, Silver Jubilee, 1955-1980, Commemorative Volume*.
- Paddock, William, and Paul Paddock. *Famine---1975? America's Decision: Who Will Survive?* Boston: Little Brown, 1967.
- Palmer, Ingrid. *How revolutionary is the Green Revolution?* London: Voluntary Committee on Overseas Aid and Development, 1972.
- Pothen, Paul. "Toward Technological Self-Reliance." In *Development of Fertilisers in India: FAI, Silver Jubilee, 1955-1980, Commemorative Volume*. Edited by T. M. Alexander, 113--131. New Dehli, 1980.
- Plucknett, Donald L., and Nigel J. H. Smith. "Agricultural Research and Third World Food Production." *Science* 217, no. 4556 (1982): 215-20.
- Rostow, Walt W. *The Stages of Economic Growth: A Non-Communist Manifesto*. Cambridge: Cambridge University Press, 1990 [1960].
- Schultz, Theodore W. *Transforming Traditional Agriculture*. New York: Arno Press, 1964 [1961].

Sivaraman, B. "Fertilisers in Indian Agriculture." In *Development of Fertilisers in India: FAI, Silver Jubilee, 1955-1980, Commemorative Volume*. Edited by T. M. Alexander, 31–62. New Delhi, 1980.

Sunkel, Osvaldo. "Big Business and "Dependencia": A Latin American View." *Foreign Affairs* 50, no. 3 (1972): 517–31.

The Rockefeller Foundation and The Office of Science and Technology Policy. *Science for Agriculture: Report of a Workshop on Critical Issues in American Agriculture*. New York: The Rockefeller Foundation, 1982.

Truman, Harry S. "Truman's Inaugural Address: Delivered in Person at the Capitol." Accessed March 21, 2019.
https://www.trumanlibrary.org/whistlestop/50yr_archive/inagural20jan1949.htm.

United Nations Centre on Transnational Corporations. "Transnational Corporations in the Fertilizer Industry." United Nations Organization, New York, 1982.

Vogt, William, and Bernard M. Baruch. *Road to Survival*. Whitefish: Kessinger, 2010 [1948].

Wharton, Clifton R. *Subsistence Agriculture & Economic Development*. New York: Routledge, 1969.

 SECONDARY LITERATURE

Ahlberg, Kristin L. *Transplanting the great society: Lyndon Johnson and Food for Peace*. Columbia: University of Missouri Press, 2008.

Araghi, Farshad A. "Global Depeasantization, 1945-1990." *The Sociological Quarterly* 36, no. 2 (1995): 337–68.

Bair, Jennifer. "Corporations at the United Nations: Echoes of the New International Economic Order?" *Humanity* 6, no. 1 (2015): 159–71.

Baijal, S. S. "Fertiliser Policies and their impact of fertiliser production and consumption." In *Development of Fertilisers in India: FAI, Silver Jubilee, 1955-1980, Commemorative Volume*. Edited by T. M. Alexander, 259–76. New Dehli, 1980.

Bentley, Jerry H. "Globalizing history and historicizing globalization." *Globalizations* 1, no. 1 (2004): 69–81.

Borowy, Iris. "Wissenschaft und Technik für Entwicklung in einer postkolonialen Welt. Verhandlungen bei den Vereinten Nationen, 1960–1980." [Science and Technology for Development in a Postcolonial World. Negotiations at the United Nations, 1960-1980] *NTM* 26, no. 1 (2018): 31–62.

Broehl, Wayne G. *The Village Entrepreneur: Change Agents in India's Rural Development*. Cambridge, Mass., London: Harvard University Press, 1978.

Buttel, Frederick H., Martin Kenney, and Jack Kloppenburg. "From Green Revolution to Biorevolution: Some Observations on the Changing Technological Bases of Economic Transformation in the Third World." *Economic Development and Cultural Change* 34, no. 1 (1985): 31–55.

Chennai. "CS ushered in Green Revolution." *The Hindu*, August 11, 2000. Accessed 07.29.2019. <https://www.thehindu.com/todays-paper/tp-miscellaneous/tp-others/cs-ushered-in-green-revolution/article28052960.ece>.

Chicago History Society. "International Minerals & Chemical Corp." Accessed 10.15.2019. <http://www.encyclopedia.chicagohistory.org/pages/2724.html>.

Cooper, Frederick, and Randall M. Packard. *International Development and the Social Sciences: Essays on the History and Politics of Knowledge*. Berkeley, Calif., London: University of California Press, 1997.

Cullather, Nick. "Development? It's History." *Diplomatic History* 24, no. 4 (2000): 641–53.

Cullather, Nick. "Miracles of Modernization: The Green Revolution and the Apotheosis of Technology." *Diplomatic History* 28, no. 2 (2004): 227–54.

Cullather, Nick. *The Hungry World: America's Cold War Battle Against Poverty in Asia*. Cambridge, Mass.: Harvard University Press, 2010.

Dimier, Véronique. *The Invention of a European Development Aid Bureaucracy: Recycling Empire*. Basingstoke: Palgrave Macmillan, 2014.

Engerman, David, and Corinna R. Unger. "Introduction: Towards a Global History of Modernization." *Diplomatic History* 33 (2009).

Engerman, David C. *The Price of Aid: The Economic Cold War in India*. Cambridge Massachusetts: Harvard University Press, 2018.

Escobar, Arturo. *Encountering Development: The Making and Unmaking of the Third World*. Princeton, N.J.: Princeton University Press, 1995.

Ferguson, James. *The Anti-Politics Machine*. Minneapolis: University of Minnesota Press, 1985.

Fitzgerald, Deborah. "Exporting American Agriculture: The Rockefeller Foundation in Mexico, 1943-53." *Social Studies of Science* 16, no. 3 (1986).

Frankel, Francine R. *India's Political Economy, 1947-1977: The Gradual Revolution*. Princeton, N.J.: Princeton University Press, 1978.

Frey, Marc. "Neo-Malthusianism and development: shifting interpretations of a contested paradigm." *Journal of Global History* 6, no. 01 (2011): 75–97.

Garavini, Giuliano. "From Boumedienomics to Reaganomics: Algeria, OPEC, and the International Struggle for Economic Equality." *Humanity: An International Journal of Human Rights, Humanitarianism, and Development* 6, no. 1 (2015): 79–92.

Gerlach, Christian. "Der Versuch zur globalen entwicklungspolitischen Steuerung auf der World Food Conference von 1974." *WerkstattGeschichte* 31, no. 31 (2002): 50–91.

Gerlach, Christian. "Illusions of Global Governance: Transnational Agribusiness inside the UN System." In *Food and Globalization: Consumption, Markets and Politics in the Modern World*. Edited by Alexander Nützenadel and Frank Trentmann, 193–211. Oxford, New York: Berg, 2008.

Gilman, Nils. *Mandarins of the Future: Modernization Theory in Cold War America*. Baltimore, London: Johns Hopkins University Press, 2003.

Gilman, Nils. "The New International Economic Order: A Reintroduction." *Humanity* 6, no. 1 (2015): 1–16.

Gnutzmann, Hinnerk, and Piotr Spiewanowski. "Did the Fertilizer Cartel Cause the Food Crisis?" *SSRN Electronic Journal*, December 2014.

Hamilton, Shane. *Supermarket USA: Food and Power in the Cold War Farms Race*. New Haven CT: Yale University Press, 2018.

Hansen, Gary E. "Indonesia's Green Revolution: The Abandonment of a Non-Market Strategy toward Change." *Asian Survey* 12, no. 11 (1972): 932–46.

Harwood, Jonathan. *Europe's Green Revolution and Others Since: The rise and fall of peasant-friendly plant breeding* 56. London, New York: Routledge, 2012.

Harwood, Jonathan. "The green revolution as a process of global circulation: plants, people and practices." *Historia Agraria. Revista de agricultura e historia rural* 75 (2018): 7–31.

Harwood, Jonathan. "Was the Green Revolution intended to maximise food production?" *International Journal of Agricultural Sustainability* 45, no. 6 (2019): 1–14.

Hendrickson, Mary, Philip H. Howard, and Douglas H. Constance. "Power, Food and Agriculture: Implications for Farmers, Consumers and Communities." *SSRN Electronic Journal*, 2017.

Hodge, Joseph Morgan. *Triumph of the Expert: Agrarian doctrines of Development and the Legacies of British Colonialism*. Athens: Ohio University Press, 2007. <http://www.loc.gov/catdir/enhancements/fy0615/2006101505-b.html>.

Hodge, Joseph Morgan. "Writing the History of Development (Part 1: The First Wave)." *Humanity: An International Journal of Human Rights, Humanitarianism, and Development* 6, no. 3 (2015): 429–63.

Immerwahr, Daniel. *Thinking Small: The United States and the Lure of Community Development*. Cambridge, Massachusetts: Harvard University Press, 2015.

Jachertz, Ruth. "'To Keep Food Out of Politics': The UN Food and Agriculture Organization, 1945-1965." In *International Organizations and Development, 1945-1990*. Edited by Marc Frey, Sönke Kunkel and Corinna R. Unger, 75–100. Palgrave Macmillan transnational history series 41. Basingstoke, GB: Palgrave Macmillan, 2014.

John, Easo. "Growth in Fertiliser Consumption in India." In *Development of Fertilisers in India: FAI, Silver Jubilee, 1955-1980, Commemorative Volume*. Edited by T. M. Alexander, 149–168. New Dehli, 1980.

Kapoor, Ashok. *International Business Negotiations: A Study in India*. New York: New York University Press, 1970.

Kapur, Devesh, Richard Charles Webb, and John P. Lewis. *The World Bank: Its First Half Century*. Washington, D.C: Brookings Institution, 1997.

Kloppenburger, Jack, and Martin Kenney. "Biotechnology, Seeds, and the Restructuring of Agriculture." *Insurgent Sociologist* 12, no. 3 (1984): 3–17.

Kloppenburger, Jack Ralph. *First the Seed: The Political Economy of Plant Biotechnology, 1492-2000*. 2nd ed. Science and technology in society. Madison, Wis.: University of Wisconsin Press, 2004.

Kobrin, Stephen J. "Expropriation as an Attempt to Control Foreign Firms in LDCs: Trends from 1960 to 1979." *International Studies Quarterly* 28 (1984): 329–48.

Kobrin, Stephen J. "Multinational Corporations, the Protest Movement, and the Future of Global Governance." In *Leviathans: Multinational Corporations and the New Global History*. Edited by Alfred d. Chandler and Bruce Mazlish, 219–36. Cambridge, Mass.: Cambridge University Press, 2005

Kumar, Prakash, Timothy Lorek, Tore C. Olsson, Nicole Sackley, Sigrid Schmalzer, and Gabriela Soto Laveaga. "Roundtable: New Narratives of the Green Revolution." *Agricultural History* 91, no. 3 (2017): 397.

Latham, Michael E. *Modernization as Ideology: American Social Science and "Nation Building" in the Kennedy Era*. Chapel Hill, N.C., London: University of North Carolina Press, 2000.

Leaf, Murray J. "Agribusiness." In *Encyclopedia of world environmental history*. Edited by Shepard Krech, John R. McNeill and Carolyn Merchant, 23–27. New York, London: Routledge, 2004.

Lorek, Timothy W. "Imagining the Midwest in Latin America: US Advisors and the Envisioning of an Agricultural Middle Class in Colombia's Cauca Valley, 1943-1946." *Historian* 75, no. 2 (2013): 283–305.

Loveridge, Jack. "Between hunger and growth: pursuing rural development in Partition's aftermath, 1947–1957." *Contemporary South Asia* 25, no. 1 (2017): 56–69.

Loveridge, Jack. "The Hungry Harvest: Philanthropic Science and the Making of South Asia's Green Revolution, 1919–1964." PhD Diss., 2017.

Lytle, Mark H. *The Gentle Subversive: Rachel Carson, Silent spring, and the Rise of the Environmental Movement*. New York, Oxford: Oxford University Press, 2007.

Marglin, Stephen A. "Farmers, Seedsmen, and Scientists: Systems of Agriculture and Systems of Knowledge." In *Decolonizing knowledge: From development to dialogue*. Edited by Frédérique Apffel-Marglin and Stephen A. Marglin, 185–248. New York: Clarendon Press, 1996.

Martini, Edwin A. *Agent Orange: History, Science, and the Politics of Uncertainty*. Culture, politics, and the cold war. Amherst: University of Massachusetts Press, 2012.

Mazlish, Bruce, and Ralph Buultjens. *Conceptualizing Global History*. Boulder, Oxford: Westview Press, 1993.

McNeill, John Robert. *Something New Under the Sun: An Environmental History of the Twentieth-Century*. New York: W. W. Norton, 2000.

McNeill, John Robert. "The Environment, Environmentalism, and International Society in the Long 1970s." In *The shock of the global: The 1970s in perspective*. Edited by Niall Ferguson, 263–278. Cambridge, Mass., London: Belknap, 2010.

Merrill, Dennis Joseph. *Bread and the Ballot: The United States and India's Economic Development, 1947--1963*. UNC Press enduring editions. Chapel Hill: University of North Carolina Press, 1990.

BIBLIOGRAPHY

- Millikan, Max F., and Walt W. Rostow. "Notes on Foreign Economic Policy." In *Universities and Empire: Money and Politics in the Social Sciences During the Cold War*. Edited by Christopher Simpson, 39–55. New York: New Press, 1998..
- Mitchell, Timothy. *Rule of Experts: Egypt, Techno-Politics, Modernity*. Berkeley, Calif., London: University of California Press, 2002.
- Murphy, Priscilla Coit. *What a Book Can Do: The Publication and Reception of Silent Spring*. Studies in print culture and the history of the book. Amherst: University of Massachusetts Press, 2005.
- Nair, Gopakumar M. *Story of an Era Told Without Ill-will*. DC Books, 2014.
- Nair, Kusum. *In Defense of the Irrational Peasant: Indian Agriculture After the Green Revolution*. Chicago, London: University of Chicago Press, 1979.
- Edited by T. M. Alexander, 192–220. New Dehli, 1980.
- Olsson, Tore C. *Agrarian Crossings: Reformers and the Remaking of the US and Mexican Countryside*. Princeton: Princeton University Press, 2017.
- Oliveiro, Vente. "The United States, Multinational Enterprises, and the Politics of Globalization." In *The shock of the global: The 1970s in perspective / edited by Niall Ferguson ... [et al.]*. Edited by Niall Ferguson, 143--159. Cambridge, Mass., London: Belknap, 2010.
- Oreskes, Naomi, and Erik M. Conway. *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*. New York: Bloomsbury, 2010.
- Parayil, Govindan. "Mapping technological trajectories of the Green Revolution and the Gene Revolution from modernization to globalization." *Research Policy* 32, no. 6 (2003): 971–90.
- Patel, Raj. "The Long Green Revolution." *Journal of Peasant Studies* 40, no. 1 (2013): 1–63.
- Pearce, Kimber Charles. *Rostow, Kennedy, and the Rhetoric of Foreign Aid*. Rhetoric and public affairs series. East Lansing: Michigan State University Press, 2001.
- Perkins, John H. *Geopolitics and the Green Revolution: Wheat, genes, and the Cold War*. New York, Oxford: Oxford University Press, 1997.
- Posgate, W. D. "Fertilizers for India's Green Revolution: The Shaping of Government Policy." *Asian Survey* 14, no. 8 (1974): 733–50.
- Randhawa, M. S. "Green Revolution in Punjab." *Agricultural History* 51, no. 4 (1977): 656–61.
- Rantanen, Terhi. *The Media and Globalization*. London: SAGE, 2005.
- Raymond Vernon. "Economic Sovereignty at Bay." *Foreign Affairs* 47, no. 1 (1968): 110–22. Accessed October 7, 2019.

Redfern, William A. "Sukarno's Guided Democracy and the Takeovers of Foreign Companies in Indonesia in the 1960s." PhD Diss., University of Michigan, 2010.

Rix, Alan G. *Japan's economic aid: Policy-making and politics*. Routledge library editions Japan 13. London: Routledge, 2011.

Robinson, Geoffrey. *The Killing Season: A History of the Indonesian Massacres, 1965-66*. Human Rights and Crimes against Humanity 29. Princeton, NJ: Princeton University Press, 2018.

Rosenau, James N. "Many globalizations, one international relations." *Globalizations* 1, no. 1 (2004): 7–14.

Ross, Eric B. *The Malthus Factor: Population, Poverty and Politics in Capitalist Development*. London: Zed Books, 1998.

Sabine Pitteloud. "Swiss Multinationals Facing the Creation of International Guidelines in the 1970s between Foreign Diplomacy and Coordinated Capitalism." Workshop on Multinational Corporations and the Politics of International Trade, Florence, 04.23.2019.

Sackley, Nicole. "Foundation in the Field: The Ford Foundation New Delhi Office and the Construction of Development Knowledge, 1951–1970." In *American Foundations and the Coproduction of World Order in the Twentieth Century*. Edited by John Krige and Helke Rausch, 232–60. Göttingen: Vandenhoeck & Ruprecht, 2012.

Saha, Madhumita. "Food for Soil, Food for People: Research on Food Crops Fertilizers, and the Making of "Modern" Indian Agriculture." *Technology and Culture* 54, no. 3 (2013): 289–316.

Sasson, Tehila. "Milking the Third World? Humanitarianism, Capitalism, and the Moral Economy of the Nestlé Boycott." *The American Historical Review* 121, no. 4 (2016): 1196–1224.

Saxon, Wolfgang. "George L. Mehren Is Dead at 79; Ex-Official in Agriculture Dept." *The New York Times*, 07.28.1992. <https://www.nytimes.com/1992/07/28/us/george-l-mehren-is-dead-at-79-ex-official-in-agriculture-dept.html>.

Saxon, Wolfgang. "Charles S. Dennison, 78, Advisor to Governments on many Issues." *The New York Times*, 05.28.1996. Accessed 10.18.2019. <https://www.nytimes.com/1996/05/28/us/charles-s-dennison-78-advisor-to-many-governments-on-many-issues.html>.

Sayward, Amy L. *The birth of development: How the World Bank, Food and Agriculture Organization, and World Health Organization changed the world, 1945-1965*. New studies in U.S. foreign relations 1. Kent, Ohio: Kent State University Press; London, 2006.

Schiller, Martin. "The "Green Revolution" in Java: Ecological, socio-economic and historical perspectives." *Prisma*, No. 18 (1980): 71–93.

Schmalzer, Sigrid. *Red Revolution, Green Revolution: Scientific Farming in Socialist China*. Chicago: University of Chicago Press, 2016.

Scott, James C. *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. New Haven, Conn., London: Yale University Press, 1998.

Shiva, Vandana. *The Vandana Shiva Reader*. Culture of the land. Lexington: The University Press of Kentucky, 2014.

Simpson, Bradley R. *Economists with Guns: Authoritarian Development and U.S.-Indonesian relations, 1960-1968*. Stanford, Calif.: Stanford University Press, 2008.

Spielman, David J., and Klaus von Grebmer. "Public-Private Partnerships in International Agricultural Research: An Analysis of Constraints." *The Journal of Technology Transfer* 31, no. 2 (2006): 291-300.

Staples, Amy L. S. "To Win the Peace: The Food and Agriculture Organization, Sir John Boyd Orr, and the World Food Board Proposals." *Peace & Change* 28, no. 4 (2003): 495-523.

Stoll, Mark. "Industrial and agricultural interests fights back." <http://www.environmentandsociety.org/exhibitions/silent-spring/industrial-and-agricultural-interests-fight-back>.

Stone, Glenn Davis, and Dominic Glover. "Disembedding Grain: Golden Rice, the Green Revolution, and heirloom seeds in the Philippines." *Agriculture and Human Values* 34 (2017): 87-102.

Shaw, D. John. *World Food Security: A history since 1945*. Basingstoke: Palgrave Macmillan, 2007.

Shiva, Vandana. *The Violence of the Green Revolution: Ecological Degradation and Political Conflict in Punjab*. Dehra Dun: Research Foundation for Science and Ecology, 1989.

Thelen, David. "The Nation and Beyond: Transnational Perspectives on United States History." *The Journal of American History* 86, no. 3 (1999): 965.

Unger, Corinna R. "Export und Entwicklung: Westliche Wirtschaftsinteressen in Indien im Kontext der Dekolonisation und des Kalten Krieges." *Jahrbuch für Wirtschaftsgeschichte*, no. 1 (2012): 69-86.

Unger, Corinna R. "India's Green Revolution: Towards a New Historical Perspective." *Südasiens-Chronik - South Asia Chronicle* 4 (2014): 254-70.

Unger, Corinna R. *Entwicklungspfade in Indien: Eine internationale Geschichte 1947-1980*. Göttingen: Wallstein Verlag, 2015.

Unger, Corinna R. *International Development: A Postwar History*. London, New York, Oxford, New Delhi, Sydney: Bloomsbury Academic, 2018.

Varshney, Ashutosh. "Ideas, interest and institutions in policy change: Transformation of India's agricultural strategy in the mid-1960s." *Policy Sciences* 22, no. 3 (1989): 289-323.

Varshney, Ashutosh. *Democracy, Development, and the Countryside: Urban-Rural Struggles in India*. Cambridge studies in comparative politics. Cambridge: Cambridge University Press, 1995.

Vickers, Adrian. *A history of modern Indonesia*. Second edition. Cambridge: Cambridge University Press, 2013.

Victor McFarland. "The New International Economic Order, Interdependence, and Gloablization." *Humanity* 6, no. 1 (2015): 217–34.

Victoria M. Arcega. "Technocrats as Middlemen and their Networks in the Philippine Rice Project: The Case of the Masagana 99." PhD Diss., Michigan State University, 1976.

Wattnem, Tamara. "Seed laws, certification and standardization: outlawing informal seed systems in the Global South." *The Journal of Peasant Studies* 43, no. 4 (2016): 850–67.

Williamson, John. "A Short History of the Washington Consensus." *Law and Business Review for the Americas* 15, no. 1 (2009): 7–24.

Zierler, David. *The Invention of Ecocide: Agent Orange, Vietnam, and the Scientists Who Changed the Way We Think About the Environment*. Athens: University of Georgia Press, 2011.

Zimmer, Thomas. *Welt ohne Krankheit: Geschichte der internationalen Gesundheitspolitik 1940-1970*. Göttingen: Wallstein Verlag, 2017.

LIST OF ARCHIVES

Collection	Archive	Location
Nachlass Victor Umbricht	Archiv für Zeitgeschichte	Zurich, Switzerland
<i>B 116 Bundesministerium für Ernährung, Landwirtschaft und Forsten</i> , 6.8 Internationale Angelegenheiten und Politik; <i>B 213 Bundesministerium für wirtschaftliche Zusammenarbeit</i> , 4.1 Zusammenarbeit mit öffentlichen und privaten Institutionen der Bundesrepublik	Bundesarchiv	Koblenz, Germany
<i>AWA</i> – Allgemeine Wirtschaftspolitik Agrarpolitik; <i>A BDI</i> – Geschäftsführung; S F– Sammlung Fotos	Bundesverband der Deutschen Industrie	Berlin, Germany
IP 22/8 Company files (Projects); IP 22/14 Working Group on the safe use of pesticides; IP 22/35 Sub committee on input industries; IP 22/44 Industry cooperation on agricultural research and marketing; PR 22/44 Inter-Departmental working group on natural resources and human environment; PR 4/75 Task Force on Agro-Industries Development; PR 7/2 FAO Activities on Fertilizer SP 22 Industry Cooperative Programme Company File 1971-1973 British Petroleum SP 22/8 Industry Cooperative Programme Company Files	FAO Archives	Rome, Italy
<i>Collection 1411: National Association of Manufacturers</i> , Series 1 Records 1917-1970, NAM Policy Committees: General Files, Publications, Series III: National Industrial Information Committee, Series IV: General Administrative Files, 1955-1976, Series XII Vada Horsch Subject Files, Series XIV Records of the Chairman and President;	Hagley Library	Wilmington, DE, USA

Collection 2345: National Foreign Trade Council, C. Board Meeting Dockets, II. Publications, VI. Executive Correspondence, B. Files of William H. Baldwin, 1973-1982;

Collection 1960: Chamber of Commerce;

Collection 1814: Crawford Hallock Greenewalt;

Collection 1984: Philip D. Reed Papers

<i>Sammlung AO Indonesien</i>	Hoechst	Frankfurt, Germany
<i>Sammlung AS19 Reden von Dr. W.F.L. Engel;</i>	KFW Bank	Berlin, Germany
<i>RG 59 General Recods of Department of State, Central Decimal Files, 1960-63; Central Foreign Policy File 1963-1969; Subject Numeric Files 1970-1973;</i>	National Archives	Washington, D.C., USA
<i>RG 166 Foreign Agricultural Service, Narrative Reports, (1962-1965, 1967); RG 286 Agency for Interational Development, USAID/ Bureau for Asia. Office of East Asian Affairs, 1962-1976, USAID Material Resources, USAID/Office of Nutrition, AID Contract Files</i>		
<i>Firmenarchiv Ciba-Geigy: AC1 Protokolle: Divisionsleitung, AC4 Forschung und Entwicklung, DL Protokolle, RD 9.1.02 Regionsdienste 1973-1983, RE 4.3 Rechtsberatung CIBA-PILATUS Aerial Sprying Company Ltd., Firmenarchiv CIBA: Vg 1.10.1 Verwaltung: Geschäftsleitung, Agrarchemie, Protokolle, Jahresberichte 1956-70; FO 5 Pflanzenschutz;</i>	Novartis Archiv	Basel, Switzerland
<i>Collection of Dow Chemical Company, Publications, Products</i> <i>Collection of the International Union of Pure & Applied Chemistry</i>	Othmer Library	Philadelphia, PA, USA
<i>Agricultural Development Council, Inc. records, Record Group 1 (FA078) and 2 (FA1440);</i>	Rockefeller Center	Archive Sleepy Hollow, NY, USA

LIST OF ARCHIVES

Asia Society records (FA 110);

Ford Foundation records: Unpublished Records (FA 739); Press Materials (FA1322); Organizational and Employment History (FA743); International Division (FA1693);

Rockefeller Foundation records: Biographical Files (FA485); Projects 1.2 (FA1617); Projects 1.3 (FA388); Projects 1.5 (FA209); New Delhi Field Office (FA396); Oral Histories (FA119);

International Basic Economy Corporation – Associations (FA084);

J. George Harrar Papers (FA046);

Ralph W. Cummings Junior Papers (FA116);

Sammlung Uhde Ingenieurbüro;

ThyssenKrupp Archives

Duisburg,
Germany

Monsanto company collection: Executive bios; Organizational Units Series 01; Products (Trade Name) Series 04; Manuscripts Series 32 (Box 02)

**Washington University
Library**

St. Louis,
MO, USA

LIST OF PUBLICATIONS AND CONFERENCE CONTRIBUTIONS

PUBLICATION

Research report with the Rockefeller Archive Center: *American Seed Business, the Rockefeller Foundation, and Indian Seed Development in the early 1960s*.
<https://www.issuelab.org/resource/american-seed-business-the-rockefeller-foundation-and-indian-seed-development-in-the-1960s.html>

CONFERENCE CONTRIBUTIONS

Paper Presentation *The behemoths of rural development? Multinational corporations gaining momentum in the 1960s and 1970s* at the annual meeting of the Agricultural History Society, Washington, DC, June 2019.

Paper Presentation *The BIMAS project in Java, Indonesia, 1968-1970* on the panel *Pathways to agricultural development in postcolonial Southeast Asia* at the EuroSEAs Conference, Berlin, September 2019.

WORKSHOPS

Ressourcenabhängigkeit und ökonomisches Kalkül. Entscheidungsfindung der chemischen Industrie des 19. und 20. Jahrhunderts, Mai 2018, Goethe Universität Frankfurt.

Managing the Land: Agricultural and Rural Actors in Twentieth Century Europe, April 2019, EUI Florence.

Multinational Corporations and the Politics of International Trade, April 2019, EUI Florence.

Paper Presentation “The Role of Multinational Corporations in the Green Revolution, 1960s and 1970s”, *International History of Agrarian and Rural Development Policies and Doctrines since 1950*, November 2016, EUI Florence.