

An Analysis of the Green Revolution

Aditya Kumar Dewan

Presented in Partial Fulfillment of  
the Degree of Master of Arts at the

University of Manitoba

Winnipeg, Manitoba

1978



AN ANALYSIS OF THE GREEN REVOLUTION

BY

ADITYA KUMAR DEWAN

A dissertation submitted to the Faculty of Graduate Studies of  
the University of Manitoba in partial fulfillment of the requirements  
of the degree of

MASTER OF ARTS

© 1978

Permission has been granted to the LIBRARY OF THE UNIVERSITY OF MANITOBA to lend or sell copies of this dissertation, to the NATIONAL LIBRARY OF CANADA to microfilm this dissertation and to lend or sell copies of the film, and UNIVERSITY MICROFILMS to publish an abstract of this dissertation.

The author reserves other publication rights, and neither the dissertation nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.

## Table of Contents

	Page
Abstract	i
Preface	iii
Chapter I: Introduction: Where Were the Anthropologists?	1
Chapter II: Theoretical Aspects	14
1. Development of Underdevelopment in Anthropological Perspectives	14
2. Marxist Approaches to Development and Underdevelopment	21
3. Modes of Production	25
4. The Various Modes of Production	31
Chapter III: The Green Revolution	39
1. The Meaning of the Green Revolution	39
2. Styles of Rural Development	42
3. The Green Revolution as a Capitalist Mode of Production	46
4. Historical Background of the Green Revolution	51
Chapter IV: The Green Revolution in India	59
1. The Nature of the Mode of Production in Indian Agriculture	59
2. The Green Revolution in Operation	64
3. Capitalist Farming in India	68
4. Mechanization of Agriculture in India (Forces of Production)	71
5. The Social Relations of Production: The Emerging Contradictions	73
6. Contradictions in the International Division of Labor: The Involvement of Multinational Corporations in India	79
Chapter V: The Radical Strategy in China and Vietnam	86
1. Introduction	86
2. The Green Revolution in China	87
3. The Green Revolution in North Vietnam	95
Chapter VI: Conclusions	100
Appendices	
A. Glossary	106
B. Acronyms	113
C. A Note on Indian Anthropology	114
References	118

	Page
<b>Lists of Maps and Tables:</b>	
Map 1: The Regions of India's Green Revolution	62
Map 2: Regions of Modernizing Agriculture, 1974	86
Table 1: Styles of Rural Development	43
Table 2: Extent of Spread of New Wheat Varieties	57
Table 3: Extent of Spread of New Rice Varieties	58
Table 4: Mechanization and Employment on 28 Wheat Farms in the Punjab, India	72
Table 5: Summary of the Spread of Modern Grain Production in China 1974	89
Table 6: Food Staple Production Per Capita 1972-73	90

## Abstract

The "Green Revolution", a current debate on technological solutions to food problems (modernizing "Traditional" agriculture) in the Third World, has given rise to a rapidly growing literature of high quality. Especially on India's "Green Revolution" there have been more than a hundred contributions, many of which have been published in the Economic and Political Weekly.

Due to the failure of conventional anthropological theories (such as cultural ecology and cultural materialism) in explaining the phenomena of development of underdevelopment in the Third World, this theory searches for some explanation of underdevelopment in the Marxist theory of mode of production. The central argument is that it is the mode or modes of production that determines the social totality or social organization (in an anthropological sense) and not the technology, environmental adaptation, or economy as maintained by some anthropologists.

The "Green Revolution" is considered as a concrete example of the capitalist mode of production. It is a particular American development strategy which offers "miracle" solutions to food problems of the underdeveloped countries without bringing fundamental changes in the social structure. Sponsored by the Rockefeller Foundation, Ford Foundation, Agricultural Development Council (ADC), the "Green Revolution" has spread into several Third World countries since the early 1960s. This thesis assesses the success and failures of the "Green Revolution in

the Third World in general and in India in particular. As a capitalist mode of production, the "Green Revolution" has brought about certain contradictions in the social relations of production (Agrarian unrest), destroyed the traditional mode of production, and destroyed the ecosystem in the Indian countryside and created dependence relationships between the developed and underdeveloped countries. The major beneficiaries in this strategy are the multinational corporations, rich merchants, large landholders, and the larger and wealthier commercial farmers. Thus, as a development strategy, it has totally failed because of the capitalist system of production which always tends to favor a small group of persons and pauperizes the peasants and workers.

Due to an inadequacy of the capitalist system of production in agriculture, this thesis explores briefly the Chinese and North Vietnamese styles of rural development (perhaps a socialist mode of production) and finds contrasting results between these two systems of production. In China and North Vietnam, agricultural development programs succeeded due to the absence of capitalist relations.

This thesis concludes that the Third World countries will not be able to solve their food problems as long as they continue to maintain capitalist relations both domestically and internationally.

Finally, the thesis describes a specific case of the penetration of American capitalism into the Third World and is an exposition of its basic nature.

## Preface

Anthropological research on South Asia is remarkably lacking in studies dealing with the dynamics of capitalism as well as with how the capitalist system penetrates and destroys pre-capitalist modes of production. This thesis is a modest attempt to investigate the "Green Revolution" (agricultural development in the Third World), a particular American development strategy that has been introduced in South Asia as well as in other Third World countries since the early 1960's. It also takes a brief look at Chinese and North Vietnamese styles of rural development.

A word about the method employed in this study must be noted. To avoid this problem is to risk serious misunderstanding of our present investigation. In this study, Marx's abstract-deductive method has been followed. In the Preface to Capital, Marx wrote, "neither microscopes nor chemical reagents are of use. The force of abstraction must replace (c.f. Sweezy 1970:11)". This needs some clarification. According to modern theorists in social science, it is called the method of "successive approximation" which allows one to move from abstract to more concrete levels of investigation in a step-by-step fashion. This process of abstraction removes, simplifies assumptions/hypotheses at the successive stages of investigation so that theory is able to take account and explain a wider range of actual phenomena (Sweezy 1970:11).

In a similar manner, I have taken Marx's theoretical construct, the "mode of production", as my theoretical (abstract level) base line. Thus, an abstraction has been made from the "mode of production" through the various "modes of production" and finally to the capitalist mode of production. As a concrete example of the capitalist mode of production, the "Green Revolution" is considered here as a case of the capitalist mode in terms of its potentiality of creating capitalist relations in the Third World. It should be noted here that I assume an understanding of such concepts which are also necessary for fuller understanding of the capitalist mode of production, such as "social formations", "surplus value", "accumulation of capital", "exploitation" and so on. Furthermore, a word respecting the method of quoting should be noted. Here, the quotations, dates, and in some cases, the passages have been provided in the usual way as documentary evidence in support of assertions made in the text.

Finally, a note on acknowledgement is due to all of those who helped me directly or indirectly in this study. My foremost thanks are due to my supervisor, Professor Louise E. Sweet, without whose initiative this study might never have come about. Under her able guidance, I have been able to learn how to develop a research project and other relevant skills necessary for



carrying out scientific research. Besides these, I have also been greatly benefited in developing my research skills while working as her research assistant for the last fifteen months. Finally, I am personally indebted to her for providing me with the relevant research materials which are available neither in the University of Manitoba library nor at the University of Winnipeg.

I also wish to thank Professor Sari Tudiver of the Anthropology Department of the University of Manitoba for providing me with valuable suggestions at the initial stage of this study. It may be mentioned here that, initially, I wrote a term paper on the "Green Revolution" for her course "Seminar in the Ethnography of Power Systems" which helped me in developing my thesis at the later stage.

I also wish to thank my other committee members, Professor Raymond E. Wiest, Department of Anthropology, University of Manitoba, and Professor John Loxley of the Department of Economics, University of Manitoba, for providing me with useful suggestions regarding my thesis.

Finally, a special thanks is owed to Pamela Sherlow for her superb job on the figures, maps, and typing.

Any shortcomings in this thesis, therefore, are all the more my own.

## Chapter I

### Introduction

The libraries of the universities, of the United States aid foundations and the United Nations agencies, and of various research organizations around the world are filling up with reports and studies telling us how the poor countries can get out of the poverty of underdevelopment. All of these reports and studies have one common suggestion. If enough money and Western technology are put into their economies, the poor countries will automatically start developing along the "Western" line. More precisely, the orthodox argument is that the present Third World countries are poor because of shortage of capital, lack of skills and expertise, lack of the Protestant Work Ethic, and so on. Furthermore, the common notion is that the agriculture of the Underdeveloped Countries is "backward", traditional, and based on a "cow dung" economy. The peasants are fatalistic and lazy. They have no savings, no capital and no modern technology to improve their agriculture. Disease, hunger, starvation, malnutrition, natural calamities, social and political unrest are regular features of the countryside. In order to rescue the poverty stricken millions from these conditions, orthodox theorists have provided us with the argument that the poor countries

must adopt Western technology, skills and values (capitalist ideology) and repeat the Western pattern of development.

In this period of late capitalism, the "Green Revolution" is one of the programs which has been created in the United States to develop the underdeveloped agriculture of the underdeveloped countries. (The meaning of the "Green Revolution" will be discussed later.) Proponents of the "Green Revolution" maintain that there have been startling achievements of food production in recent years in Third World countries where foreign aid programs have introduced "High Yielding Varieties" (HYV) of wheat and rice together with appropriate technological changes. Dr. Norman E. Borlaug<sup>1</sup> was awarded a Nobel Prize for Peace in 1970 for his remarkable contribution to the enlargement of the world food supply. He remarked, "Never before in the history of agriculture has a transplantation of High Yielding Varieties coupled with an entirely new technology and strategy been achieved in so short

---

<sup>1</sup> Dr. Norman E. Borlaug is an American plant biologist. As a staff member of the Rockefeller Foundation, he has spent twenty-seven years in Mexico (at the International Maize and Wheat Improvement Center) working on "wheat research and production program". At this Center, he developed the so called "Miracle Seeds" or HYV seeds and in 1970 he was awarded the Nobel Prize for Peace. Dr. Borlaug, while accepting the Nobel Peace Prize, said, "If you desire peace, cultivate justice, but at the same time cultivate the fields to produce more bread; otherwise there will be no peace" (cited by Sharma 1973:96-97).

a period of time, with such a great success"(quoted in Sharma 1973:77).

While he was talking about the introduction of the High Yielding Varieties (HYV) in the Third World countries, Borlaug continued, "You have to be brutally frank with some governments; you have to push them into using it (c.f. Harris 1973:20)". And again he says, "It does not do any good to get 10 or 15 percent yield increases....They won't listen to you. You have to throw the long bomb. You have to make a 100 or 200 percent gain to change their old worn out practices (c.f. Harris 1973:20)".

Another major spokesman for the "Green Revolution" is Lester Brown (1968, 1970a, 1970b, 1974) who repeated the glowing predictions of the "Green Revolution". In sum, advocates of the "Green Revolution" and many other liberal social scientists believe that widespread application of an improved technology based on modern science (Western capitalist) is the only way to increase agricultural production in the poor countries. But perhaps the exponents of the "Green Revolution" have already been outnumbered by the critics. The critics (Griffin 1974; Cleaver 1972, 1974, 1976; Sharma 1973; Byres 1972; Gough 1978a; Franke 1974; Frankel 1969, 1970, 1971, 1972; and many others) maintain that technical innovation frequently increases food output, no doubt, but it also makes quicker class polarization and widens the gap between the rich and the poor. The core of their argument is that food production

can also be raised by social structural changes (such as in China, Vietnam and other socialist countries) that liberates the energies of the millions in the Third World. Indeed, many Marxist scholars tend to analyse the Green Revolution as a part of the development of neo-colonial capitalism in agriculture in the Third World (Omvedt 1975:126). However, since 1965, several Third World countries (such as India, Pakistan, Mexico, the Philippines) have adopted "Green Revolution" programs and this process still continues.

In this thesis, I shall try to investigate the successes and failures of the "Green Revolution" since its inception. I shall also try to show that the "Green Revolution" is a product of capitalism and is a capitalist mode of production. As a rule (in the Marxian sense), capitalism must expand and penetrate throughout the Third World for its own survival. In this context, Marx (1968) says that the capitalist mode of production is the first historical mode of production that carried its own momentum, embracing the whole world within its net of production relations. The need for expansion into the non-European world is thus also an eminent feature of bourgeois society (1968:2). Marx further notes that:

"The bourgeoisie" cannot exist without constantly revolutionizing the instruments of production...The need of constantly expanding markets for its products chases (it) over the whole surface of the globe... (it) has through its exploitation of the world market given a cosmopolitan character to production and consumption in every country (1968:2).

Similarly, the "Green Revolution" as a capitalist mode of production (capitalist agriculture) is chasing all over the Third World countries for its expansion and survival in two ways: the selling of capitalist industrial products (tractors, farm machinery, fertilizers, etc.) and the extracting of raw materials. Thus, the dialectical result is a disaster for the poor countries and prosperity for the rich countries. The net result is the destruction of the traditional mode of production, exploitation of the peasantry, and the development of a dependence relationship between the rich and the poor countries. In this connection, Marx's remark is worth noting:

The bourgeoisie, by rapid improvement of all instruments of production, by the immensely facilitated means of communication, draws all, even the most barbarian, nations into civilization. The cheap prices of its commodities are the heavy artillery with which it batters down all Chinese walls, with which it forces the barbarians, intensely obstinate hatred of foreigners to capitulate. It compels all nations, on pain of extinction, to adopt the bourgeois mode of production; it compels them to introduce what it calls civilizations into their midst; i.e., to become bourgeois themselves. In one word, it creates a world after its own image....It has made the barbarian and the semi-barbarian countries dependent on the civilized ones, nations of peasants on nations of bourgeois, the East on the West (1968:32-33).

Due to failures of the "Green Revolution" (as can be seen in our following analysis) as a capitalist mode of production (especially in India), we shall try to explore also the consequences of the "Green Revolution" as perhaps a

socialist mode of production from the Chinese and Vietnamese experience and as an alternative model for rural development.

In this essay, an attempt has been made for the growing body of "radical anthropological" literature to understand how the actual relationship operates between the developed and the underdeveloped countries with special reference to the "Green Revolution". This topic has been chosen for several reasons. First, it has not yet received much attention from anthropologists. Secondly, it is a new formula for development of underdevelopment which has promised the poor nations a "miracle" solution of their food problems. Thirdly, the new strategy has affected the peasant societies of the Third World (about 75-80% of the total population), integrating them into the national and international capitalist market systems. Fourthly, it has made way for the effective penetration of capitalist agriculture into the Third World and thus has brought about certain contradictions in the social relations of production. Finally, since much of the current literature in anthropology has consistently failed to expose the true nature of the capitalist countries in their relationship to the underdeveloped countries, the analysis of this topic may help to expose the process of capitalist penetration in the Third World over the last two decades, countries where so much of the research of Western anthropologists has taken place.

The second chapter deals with the theoretical arguments concerning development and underdevelopment in both Marxian and non-Marxian (especially conventional anthropological theories) perspectives. Here, we shall argue that it is the mode of production that determines the totality of the society or cultures and not the technology, environment, or economy. In the third chapter, we shall demonstrate that the "Green Revolution" is a capitalist mode of production and is a product of capitalism. This will be examined through its historical development, corresponding to forces and relations of production. The fourth chapter contains the success and failures of the "Green Revolution" as a capitalist mode of production in India and its corresponding effects on rural areas. The fifth chapter looks for an alternative model for rural development by examining the Chinese and North Vietnamese styles of rural development.

In my conclusion (Chapter VI), I shall continue to argue that it is the mode of production that determines relations of social totality, rather than economy, technology, or environment. The overall impact of the "Green Revolution", where it has been introduced, will be assessed briefly. I shall also argue that the poor countries will not be able to solve their basic food problems under the capitalist system. Hence, the only solution open to them is to terminate all colonial ties, to end capitalist domination both nationally and internationally, and realign and redistribute political, social, and economic power.



"Where Were the Anthropologists?"

So far, I have been able to discover only a few published pieces of research on the "Green Revolution" by anthropologists<sup>1</sup> from the United States and Canada.

Bernett (1970) conducted a study of three Ibaloi communities<sup>2</sup> in Northern Luzon, Philippines, while working as a research anthropologist at IRRI<sup>3</sup> in the Philippines. Five new High Yielding Varieties (HYV) were tested among these communities. His basic findings indicate that "peasants are traditional, conservative, and are not receptive to innovation". Secondly, the ritual pattern of these communities hinders the accumulation of savings and affects the prospect for agricultural development. He says, "traditional religious beliefs among subsistence agriculturalists often provide dramatic examples of conservatism and the retarding of agricultural development (1970:293)". He does not indicate

---

<sup>1</sup>Milton Bernett (1970), Richard Franke (1974), Barry Michie (1973), Joan Maencher (1974a), Frank C. Miller (1975, 1977a, 1977b), Marvin Harris (1972, 1973, 1975), and Kathleen Gough (1978a). The first four discussed by Frank C. Miller in his article "Knowledge and Power: Anthropology, Policy Research, and the Green Revolution". I have used some of the ideas from his article.

<sup>2</sup>Kadasan, based on subsistence farming; Balbalikong, based on "mixed" subsistence and cash crops; and Atok, entirely dependent on commercial farming.

<sup>3</sup>International Rice Research Institute in the Philippines.

what he means by either "agricultural development" nor "conservatism", but it seems implied that he expects the adoption of capitalist technology and production for market to mark a non-conservative orientation.

Richard Franke (1974), on the other hand, found exactly the opposite impact of the "Green Revolution" in Indonesia. Under the HYV program, he maintains, only the rich farmers were benefited and the poorer farmers and small holders lost their lands in the face of increased mechanization. Multi-national corporations were given contracts for large-scale projects to increase food production. He concludes that the American sponsored "Green Revolution" has become an essential element of an elite which seeks to develop Third World countries without fundamental social change in their own interests.

Barry Michie (1973: 69) studied the impact of the "Green Revolution" in India. He criticizes Theodore Schultz (1964) and other American economists' assumptions that the peasants are conservative, traditional and poor, but efficient. As regards mechanization, he draws conclusions similar to those of Griffin (1974). He points out many ills of India's land reform legislation. The land ceilings established by law can easily be avoided by the landlords since the tenants have oral contracts with the landlords which do not hold up in court. As a result, he found more cases of eviction of tenants in the HYV areas.

Joan Mencher (1974<sub>a</sub>) is another anthropologist who made extensive empirical research in Tamil Nadu, South India. She found an alleged contradiction between increased production and redistribution of wealth. In a survey, she found that six percent of the households owned forty-six percent of the land (1974<sub>a</sub>:313) and forty-three percent of working males were agricultural wage laborers (1974<sub>b</sub>:1499). Her study reveals that it was not the "Miracle Seeds", but tubewells for irrigation which guaranteed two or three crops a year. About one-third of the larger operators have planted HYV seeds in five to ten percent of their lands. Mencher concludes that:

The professed goal of maximizing production is actually more compatible with small farmer cultivation (and/or cooperative cultivation) than with the present stress on the capitalist farmer. Maximised production is the only compatible with capitalist farming if profits are high. But, if profits are not high enough, then the capitalist farmer will turn away from basic food production into more lucrative and less troublesome crops (1974<sub>a</sub>: 318-319).

Frank C. Miller (1975, 1977<sub>a</sub>, 1977<sub>b</sub>) has published three articles on the "Green Revolution". The first (1975) is a review of Griffin's book, The Political Economy of Agrarian Change: An Essay on the "Green Revolution". In his concluding remarks, he expressed concern that anthropology has failed to contribute to the growing debate. In a second article (1977<sub>a</sub>), he continues to argue that anthropology has virtually neglected this topic and proposes that anthropology should be included in policy oriented research. The following is the abstract

of his article;

The "Green Revolution" would seem to be an ideal topic for research by economic anthropologists and cultural ecologists yet they have virtually ignored it. A classical example of the hazards in technological solutions to human problems, it has had a great impact, sometimes favorable but more often not, on peasants in some Third World nations. This paper assesses the new technology and associated economic constraints of the "Green Revolution" and criticizes the development strategies that have guided the introduction of the new technology. The sources of anthropological disinterest are considered, and the potential role of technology assessment is discussed (Miller 1977a:190).

Finally, Miller (1977b) reviewed a book, Strategies for Small Farmer Development by E.R. Morss et al. The book is a report of a study commissioned by the U.S. Agency for International Development (AID). Its major theme is about the dramatic change in United States' policies toward development assistance in the Third World during the past decade. Rather than capital-intensive technologies, it gave emphasis to organization, mobilization, and technology "appropriate to the local environment and social structure". Miller considers United States' aid as important work with significant implications for all development programs and policies. However, this review article reflects the author's tacit ideological support of these programs (22 projects in Africa, 14 in Latin America) in the Third World. He concludes that anthropology has the potential for an important impact on the continuing debate about development programs in the Third World by doing methodologically sound and politically sophisticated research.

Marvin Harris (1972, 1973, 1975) is one of the few critics of the "Green Revolution" among anthropologists. He discusses class polarization, multinational corporation involvement, ecological problems and so on. He maintains that:

...development is a problem that requires an understanding of politico-economic and ecological processes on an anthropological scale. The Green Revolution well illustrates the calamitous possibilities inherent in development approaches that disregard the relationship between technology and environment on the one hand and between politics and economy on the other (1975:449).

He attempts here to apply his "cultural materialist" approach to the study of Third World development. Is this approach capable of exposing the true relationship between the developed and the underdeveloped countries by simply focussing on technology, economy and environment? I do not believe so, for it ignores the exploitative relationship of capitalist "aid" projects with pre-capitalist or former colonial societies, the present "underdeveloped" countries of the world.

Finally, Kathleen Gough (1978a) made a brief comparative study of the "Green Revolution" in South India and in North Vietnam. This is a significant contribution to this debate, and negates bourgeois development theories produced both in North America and Europe (such as "take off into self-sustaining growth", "demonstration effect", "achievement motivation", "protestant ethics", "revolution of rising expectations", etc.

etc.).<sup>1</sup>

Apart from the above studies, anthropologists have ignored the "Green Revolution" in spite of the amount of field research in those countries where it has been introduced. Miller maintains that:

...our discipline pioneered in the study of peasant culture and it has remained one of our specialities for several decades, yet we have virtually ignored one of the biggest things in Third World agriculture since the invention of the plow (1975:427).

---

<sup>1</sup>Details of Gough's articles will be discussed in the last chapter.

## Chapter II

## Theoretical Aspects

## 1. Development of Underdevelopment in Anthropological Perspectives

In all social sciences, investigations of societies are carried out on the basis of some methodological framework. In anthropology, we find several theoretical orientations. In my investigation, I have been able to recognize two sharply contrasting approaches in current anthropology: the liberal approach and the radical approach.<sup>1</sup> Thus it is necessary to go briefly over some of the theoretical practices in conventional anthropology and assess their inadequacy in explaining the current notions of development and underdevelopment, a debate which made much controversy in academic disciplines. Among the many approaches I have chosen to focus upon only the cultural ecological and cultural materialist approaches since these two now dominate much of the current literature in conventional or liberal anthropology.

Diametrically opposite to the radical position in anthropology are the cultural ecology of Vayda, Rappaport, and others, and the cultural materialism of Marvin Harris. According to cultural ecological strategy, populations (human and animal) and their culturally patterned behavior are components of an

---

<sup>1</sup>Here I wish to take up the radical approach and to devote some space to critique of the conventional theoretical practices for I find the radical position more rigorous and logical in understanding the current notions of development strategies in the Third World.

ecosystem. Within this ecosystem, populations are regulated and adjusted in size according to the resource available.

Kaplan and Manners describe this more elaborately:

Cultural ecology is characterized by a concern with adaptation on two levels: first with regard to the way cultural systems adapt to their total environment; and second -- as a consequence of this systemic adaptation -- with regard to the way the institutions of a given culture adapt or adjust to one another. ....In general, cultural ecologists have tended to emphasize technology and economics in their analysis of cultural adaptation, because it is in these aspects of culture that the differences among cultures, as well as differences over time within a culture are most apparent (1972:75-76).

In short, cultures or societies are adaptive to their environments in relation to technology and economics. This approach is completely compatible with the functionalist approach which looks for the homeostatic mechanisms in the societies we study. Thus, the inadequacy of the functionalist approach becomes apparent when we study social change processes. Since the notion of development in the Third World is presumed to be concerned with a particular kind of change, it would be very difficult to analyze it through the ecological approach. Furthermore, from the cultural ecological point of view, we can simply argue that the capitalist system is maladaptive for a pre-capitalist system. Why is it maladaptive? We do not get the answer. Another serious problem with this approach is that it cannot explain class conflicts and exploitation in the societies we study and negates historical reasons for underdevelopment in the Third World.