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

Table of Contents

Lists of Maps and Tables:

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 arguement 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 Rockfeller 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 absense 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 regents 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 under-development. 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 Counties 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 arguement 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[1] 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

---

[1] Dr. Norman E. Borlaug is an American plant-biologist. As a staff member of the Rockfeller 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 argement 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 contries (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 arguements 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[1] from the United States and Canada.

Bernett (1970) conducted a study of three Ibaloi communities[2] in Northern Luzon, Philippines, while working as a research anthropologist at IRRI[3] 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

---

[1]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.

[2]Kadasan, based on subsistence farming; Balbalikong, based on "mixed" subsistence and cash crops; and Atok, entirely dependent on commercial farming.

[3]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. Multinational 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 (1974a 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 (1974a:313) and forty-three percent of working males were agricultural wage laborers (1974b: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 (1974a: 318-319).

Frank C. Miller (1975, 1977a, 1977b) 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 (1977a), 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.).[1]

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).

[1] 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.[1] Thus it is necessary to go briefly over some of the theoretical practices in conventional anthropology and assess their inadequecy 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

---

[1] 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 madadaptive 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 thesocieties we study and negates historical reasons for underdevelopment in the Third World.

On the other hand, the cultural materialist's position maintains that culture represents mainly adaptive solutions to material conditions of life; hence people with similar technologies tend to produce similar modes of social groupings, and similar systems of values and beliefs. It will be more clear if we look at Harris' central arguement. Thus he states:

> I believe that the analogue of the Darwinian strategy in the realm of socio-cultural phenomenon is the principle of techno-economic determinism. This principle holds that similar environments tend to produce similar arrangements of labour in production and distribution and that these in turn call forth similar kinds of social groupings which justify and coordinate their activities by means of similar systems of values and beliefs (1968:4).

Friedman termed Harris' cultural materialism as "vulgar materialism" and "economism" (1974:456), on the ground that it sees the social formations as a mere epiphenomena of technologies and environments. Friedman points out many loopholes and difficulties in the cultural materialists' assumptions. Thus, he argues that:

> ...if technology gives rise to the social structure, we are obviously going to have trouble explaining the presence of different social structures in the same techno-environment. Nor are we going to be able to deal with social change within the same technology and vice versa. How do we explain the fact that capitalist society has been able to absorb two of the greatest technological revolutions in the history of Home sapiens? How do we explain the possible advent of socialism on the same technological base that serves capitalism? (1974:461).

It appears from the above that in fact both the cultural ecologists' and the cultural materialists' strategies find their origin in the functionalist-empiricist school of American

social science. Both of them seek to explain social phenomena in terms of techno-economic and techno-environmental parameters. Against this notion of technological determinism, it can be argued that technology is not the prime mover of society since politically it can never remain neutral. Dickson (1975) maintains that technology is essentially a political process in the sense that it sustains and promotes the political system of that society where it has been developed. At the same time technology always favors the dominant social classes in the society and helps to legitimize the ideology of that class. He argues against those techno-economo-environmental determinists who see social change, development and progress in terms of technological, economical and environmental parameter. Dickson suggests that:

> ...social relations of production -- the relationships between the different social groups or classes involved in the production process -- become incorporated in the means of production and that technology and social patterns therefore reinforce each other in a dialectical fashion at both a material and an ideological level (1975:25).

Under the capitalist system, therefore, science and technology become the instrument of exploitation over the dominated social classes. Dickson maintains that technology always serves the interest of the capitalists since the control of all means of production remainsin their hands. It is in

this way that technology becomes the apparent source of exploitation and alienation of the working class (1975:25). In a similar fashion, Magdoff (1976) and Alam (1978) argue that science and technology have always been monopolized by the capitalists of the rich countries throughout the history of capitalism. Therefore, any kind of transfer of technology from developed to underdeveloped countries will result in the same kind of domination of one particular class, the owners, over the others.

However, we shall argue that production is a social process, and social production and reproduction determine the dynamic structure of the society. Since production is social, so all the activities of human beings are also social in character. We reproduce ourselves only through cooperative production of our means of subsistence (which is very different from animal society). Since people can exist only in society, individuals can never be considered as autonomous units. Each individual is determined by a set of social relations. Therefore societies should not be understood as mere aggregates of individuals, groups, nationality or ethnic groups. One must consider it as a totality of social relations (O'Laughlin 1975: 346). Marx conceptualized society on the basis of a dynamic totality of relations between people and between people and nature. The relations of this social totality imply that it is production and reproduction of human subsistence which

constitute the basis of society. Here the technical forces of production and social relations of production are the determinant aspect of this totality. "This productive system, with corresponding forms of consumption, distribution and exchange (the base), ultimately determines the form of juridical-political and ideological relations (superstructure) (O'Laughlin 1975:349)". The following well known words of Marx explain the phenomena of social totality, which is a very different concept from the conventional anthropological notions of "culture" and "society":

> In the social production which men carry on they enter into definite relations that are indispensable and independent of their wills; these relations of production correspond to a definite stage of development of their natural powers of production. The sum total of these relations of production constitute the economic structure of society -- the real foundation, on which rise legal and political superstructures and to which correspond definite forms of social consciousness. The mode of production in material life determines the general character of the social, political, and spiritual processes of life. It is not the consciousness of men that determines their consciousness. At a certain stage in their development, the material forces of production in a society come in conflict with the existing relations of production, or -- what is but a legal expression for the same thing -- with the property relations within which they had been at work before. From forms of development of the forces of production, these relations turn into their fetters. Then comes the period of social revolution. (Marx 1956:51-52).

The above conception of social totality leads us to consider the concept of mode of production which is central

to understanding the theoretical aspect of our present discussion. Before getting down to the concept of mode of production, it is necessary, however, to examine briefly the notion of development and underdevelopment advanced by some Marxist scholars.

2. Marxist Approaches to Development and Underdevelopment

Much of the Marxist writing on development and underdevelopment barely a decade ago was largely confined to the criticism of bourgeois development theories. Recently it seems to have entered into a new phase. Actually, the phenomena of development and underdevelopment in Marxist literature first appeared in the late Paul Baran's (1957) book, The Political Economy of Growth. His work greatly influenced A.G. Frank, Paul Sweezy and other younger Marxists. Baran exposed the inadequacies and, above all, the ideological nature of the conventional development theories. (Here, "development" is the concept of the economists; it is better left unrestricted by an attempt to define it here for the "true meaning" becomes very paradoxical and very interesting in the course of discussion.) He held the opinion that Western development had taken place at the expense of the underdeveloped countries. He firmly believed that the only solution for the underdeveloped countries was to "break out" of the imperialist system of world capitalism into socialism (Foster-Carter 1974:80).

However, the Marxist scholars are not very much concerned about the conventional development theories; rather, they are now more deeply engaged in developing Marx's theoretical strengths on various aspects of underdevelopment. Today, we find many controversies and debates on this issue among those

who claim to be Marxists. Their varieties of opinions and analyses are increasingly dividing them over the fundamental issues of development theories. Let us briefly examine some of those who have raised fundamental questions in the debate.

Foster-Carter (1978:47-77) briefly reviewed much of the most recent materials on this issue. Most important among them are: Warren's (1973) "stages of growth" theory; Kay's (1975) "blocked transition"; Amin's (1974) "blocked transition" or "central-periphery" formula; Frank's (1967, 1969) "dependency" or "metropolis-satellite" formula; Wallerstein's (1974) "world system", and so on.

To Warren (1973), Third World countries are now at an early stage of capitalist development and are under a process of development along Western lines. This, he argues from the experience of the capitalist development of the developed countries. Thus the underdeveloped countries are en route to capitalist development. This sounds like the ideas of cultural evolutionists in anthropology of the American school, or Rostow's "take-off stages" of development. Many Marxists reject this idea on the grounds that the Third World is not en route to capitalist development along the western lines. Against this, Kay (1975) presents the "blocked transition" model. This means that the penetration of capitalism in the Third World is partial or incomplete. He argues that "capital created underdevelopment not because it exploited the

underdeveloped world, but because it did not exploit it enough (cited by Foster-Carter 1978:48). He puts all the blame on merchant capital for its unduly prolonged dominance over the Third World which failed to revolutionize the modes of production there. Similarly, this "blocked transition" model becomes "peripheral capitalism" to Amin (1974, 1976). He argues that in the developed countries, the normal process of capitalist development has taken place on the basis of a dynamic relationship between producer goods and consumer goods sectors (Marx's Department I and II), and fueled by the home market demand. On the other hand, he did not find a similar mechanism in the Third World. The Third World has always been externally oriented. Hence, production is traditionally export-oriented and consumption is import-oriented. As a result, the relationship between these two sectors could not produce the normal development of capitalism as we find it today in the developed countries. As a result, an unequal exchange system has developed between the developed and the underdeveloped countries. Amin designates these as "central" and "peripheral" social formations. Frank's (1967, 1969) position is that it is capitalism which has created underdevelopment in the Third World. According to him, capitalism has created a uniform hierarchy of "metropolis and satellite", nationally and internationally, of which the

former extracts surplus from the latter. As a result, the "satellite" became dependent on the "metropolis". In similar fashion, Wallerstein (1974) also considers capitalism as a single "world system" and it is capitalism throughout the world that has created underdevelopment. But Foster-Carter(1978) has very clearly detected some of the limitations of the "dependency school". He reasons that the "dependency school" has problems of scope or scale. This means that "dependency" might well suggest a macro-framework but has problems of shifting from general statements to micro-fieldwork. For example, Frank's concepts like "metropolis" and "satellite" is easier to pin down than Rostow's "stages of growth". The second operational problem is that the dependency approach is not broad in scope but downright confusing and contradictory and lacking conceptual rigour. Finally, it has a vague Marxist idea which is based on Latin American bourgeois nationalism (Foster-Carter 1978:49-50).

Due to various limitations of the above theories, many Marxist anthropologists (Rey, Terray, Godelier, and many others) have focussed their attention on the "mode of production".

3. Mode of Production

A mode of production may be understood as a combination of the forces and relations of production. More precisely, Hindess and Hirst maintain that a mode of production, "is an articulated"[1] combination of relations and forces of production structured by the dominance of the relations of production (1975:9)". By mode of production, Long means, "that complex made up of the forces of production (i.e., technical skill, resources, instruments of labor, and labor power) and the social relations of production (1975:267)". Finally, Althusser and Balibar define a mode of production as a:

> ...complex structure, doubly articulated by the productive forces connexion and the relation of production connexion (q.v.), and containing three elements: the laborer, the means of production (sub-divided into object of labor and instrument of labor), and non-laborer (1970:317).

---

[1]The term "articulation" was first used by Louis Althusser and Etienne Balibar in Reading Capital (1970). It has several meanings in both English and French: "combination", "contradiction", "mode of production", "joining together", "giving expression", to "linking of different instances or levels" and so on. From these meanings, various Marxist scholars derived the "idea of articulation" and used it while analyzing the impact of the capitalist mode of production on the pre-capitalist mode.

From the above definitions, two pivotal elements should be noted: the forces of production and the relations of production, which are central to understanding the construct of mode of production. Since these two elements are important, we need to analyze them in order to understand the importance of mode of production in the analysis of society.

Forces of Production:

In order to understand the forces of production in a particular mode, we have to look at relations between people and their means of production in the productive process. This means we must identify in a particular mode of production the various productive units, the labor process (labor power, activities of the people), the instruments/tools used (technology), nature/ecology (nature such as land and/or other resources). According to Hindess and Hirst:

> Forces of production refers to the mode of appropriation of nature, that is to the labor process in which a determinate raw material is transformed into a determinate produce. "The determinate elementary factors of the labor process are 1. the personal activity of man, ie. work itself, 2. the subject of that work, and 3. instruments (Capital 1:p.178) (1975:10-11)".

Thus, in the forces of production we find men, their activities/works, the tools they use, the nature they appropriate and the way they transform the nature into product for their use.

Relations of Production:

Hindess and Hirst defined "relations of production" as a "specific mode of appropriation of surplus labour and the specific forms of social distribution of the means of production corresponding to that mode of appropriation of surplus labor (1975:9-10)". Similarly, O'Laughlin defined it by looking at ",...relations of appropriation between persons that are based on the relation of the workers to their product and means of production (1975:362)". Thus in Marx's analysis of relation of production, one can find the root of class formation in a given society when the appropriation of surplus labor takes place by a class of non-producers. According to Marx:

> The essential difference between the various economic forms of society, between, for instance, a society based on slave-labour, and one based on wage-labour, lies only in the mode in which this surplus-labour is in each case extracted from the actual producer, the labourer (1967:217).[1]

In sum, production is a social process by which men with their labor power and technology transform the object of labor in order to reap some material return. The object of labor (such as land and natural resources) and the instruments of labor (technology, skills, etc.) constitute the means of

---

[1] A number of Marxist anthropologists, such as Terray (1972) and Rey (1971) applied this particular citation in their analysis of pre-capitalist societies as well as O'Laughlin (1975) in her analysis of "Marxist Approaches in Anthropology".

production. The combination, men, activities of men, technology and nature, all of these elements constitute the forces of production. But in the process of production, men are brought together in terms of a specific set of relations. These relations are basically social in nature; they are determined in terms of the ownership and control of the means of production and of the social product. Thus the mode of production can only be understood in terms of examining the forces and relations of production. Similarly, Hindess and Hirst maintain that "...there can be no definition of the relations or of the forces of production independently of the modes of production in which they are combined (1975:11)". Finally, Talal Asad (1976)[1] while reviewing Hindess' and Hirst's book, Pre-capitalist Modes of Production, (1975) finds three conditions which must be satisfied by a concept if it is to be the concept of the determinant mode of production:

1. It must define a set of relations of production which comprise a mode of appropriation of surplus-labour and a corresponding distribution of the means of production.

---

[1] Of course, he criticizes Hindess and Hirst for their inability to satisfy these conditions in their book and also raises the question of how rigorous and coherent is the general concept of mode of production.

2. It must define a set of productive forces which can be deduced from the mode of appropriation of the surplus.

3. It must combine together both relations and forces of production under the dominance of the former (1976:478).

The above analysis of mode of production must be understood by conceptualizing some of the issues. Otherwise, this may lead us to the domain of structuralist and cultural materialists' causality. The mode of production must be conceptualized through the concept of "general versus specific" and "dialectical" causality.

General versus Specific:

To make the distinction between general and specific categories is a central problem in scientific analysis and this problem cannot be resolved entirely within theory itself. The purpose of theory is to develop abstractions through which the concrete (always historically specific) can be understood. In the analysis of mode of production, a set of universal concepts cannot alone define any particular mode of production. Thus, the analysis of mode of production must be movement from abstract general determination to observation and conception at the level of the concrete and then back to the theoretical articulation of general and specific categories (O'Laughlin 1975:351). Therefore, in the process of abstraction, one has to move back from theory to data in order to see how well the concrete is explained by the theory. Thus, we need

specification of a mode of production (such as capitalist, feudal, ancient, Asiatic, slave, and primitive) in the analysis of any problem(at a more concrete level, for instance, the Green Revolution, class relations in the United States, and so on).

Dialectical Conceptualization:

The mode of production must be conceptualized as a dialectical unity and opposition of forces and relations of production. "The basis of this dialectical relationship is the unity of people with nature and the opposition of people to nature (O'Laughlin 1975:354)". Any failure to recognize its dialectical nature is to reduce analysis to structuralism and structural-functionalism of liberal anthropology. Thus, this dialectical relationship between forces and relations of production is the key to understanding the social change processes as well as "uneven, periodized and non-teleological process of human evolution (O'Laughlin 1975:354)".

The above generalization of the mode of production leads us to examine, at a more concrete level, the various modes of production which have existed throughout the history of human civilization.

4. The Various Modes of Production

The above discussion of the concept of mode of production is an abstract one. It does not imply any historical order or sequence through the social history of mankind that stretches from the hunting-gathering stage down to the stage of modern capitalism. Marxist scholars (such as Hindess and Hirst 1975; Amin 1976; Godelier 1978, who have drawn their ideas from Marx) have recognized six types of mode of production throughout the entire history of production. These are as follows:

1. The Primitive Communist Mode of Production;
2. The Asiatic Mode of Production;
3. The Ancient Mode of Production;
4. The Slave Mode of Production;
5. The Feudal Mode of Production;
6. The Capitalist Mode of Production.

Let us briefly examine them one by one in order to proceed towards the more concrete level of our subject of investigation. The analysis will help us to understand the "Green Revolution" as a capitalist mode of production.

1. The Primitive Communist Mode of Production

The primitive communist mode of production was recognized by Marx in hunting and gathering societies. It is the first mode of production that provides the basis for embryonic class distinctions (Amin 1976:4), and is "based on links of kinship, language, and customs (Godelier 1978:220)". This mode of production is characterized by a collective appropriation of

surplus labor. More precisely, "there are no classes, no state and no politics, and (it) consists of the articulated combination of the economic and the ideological level (Hindess and Hirst 1975:41)". Ownership of land and other natural resources belong to the whole community and appropriation and use of soil takes place jointly. The main subsistence patterns are hunting, gathering, fishing, and shifting cultivation.[1]

2. The Asiatic Mode of Production[2]

The Asiatic Mode of Production existed in four continents: Asia (China, India, Indo-China, Mesopotamia), Africa (Egypt and black Africa), Europe (pre-classical societies of Crete and Etruria) and in pre-Columbian America (Incas, Aztecs, etc.) (Amin 1976). Amin designated it as the tribute paying mode of production. According to Godelier, it emerged when more developed forms of production allowed a regular surplus, which is the condition for a complex division of labor and separation of agriculture from manufacture. This creates the self-sustaining character of production. Here, the production is not for exchange value in the market but for use. The use of money is very limited. The communities (such as ancient village communities of India) are represented by an assembly of heads of families, or a supreme chief (1978:221). More precisely,

---

[1] For example, Meillasoux's study of the Guru, and some of the peoples of Black Africa, such as Hausa, and the Yanomamo of Brazil.

[2] The notion of the Asiatic mode of production has been the subject of much controversy among scholars. It is beyond our scope to review this here.

Godelier maintains that:

> The very essence of the Asiatic mode of production is the existence of primitive communities in which ownership of land is communal and which are still partly organized on the basis of kinship relations, combined with the existence of state power, which expresses the real or imaginary unity of these communities, controls the use of essential economic resources, and directly appropriates part of the labor and production of the communities which it dominates (1978:212).

He further argues that this mode of production might be one of the possible forms of transition from classless to class societies. It might "contain the contradiction of this transition; i.e., the combination of communal relations of production with embryonic forms of the exploiting classes and of the state (1978:212)".

3. The Ancient Mode of Production

Marx finds the ancient mode of production, in its purest form, in ancient Rome, Greece, and the Hellenistic world (classical antiquity). According to Hindess and Hirst, the appropriation of surplus labor, and the dominant social relations of production in the ancient world take place by right of citizenship. The extraction of surplus labor from citizens and the distribution of resources (such as land) take place through the political and legal apparatuses of the state. These operate through communal extraction by the state and these extractions are distributed among the citizens by the state machinery (1975:82). Cities or towns were the centers of everything (such as trade and commerce, residents, etc.).

Two types of landed property existed; one remains under the control of the community (state ownership) and the other is split up into two plots and distributed as private property to each Roman citizen. Thus, the individual became the co-owner or the private owner of his plot. The development of commodity production, conquests, etc., created the growth of inequality between free men. Debt, bondage, private use of slaves became widespread. Subsequently, this created the conditions for its transition to the full blown slave mode of production (Godelier 1978:225-26). Finally, Hindess and Hirst have specified the Ancient Mode of Production in the following manner:

> 1. a social devision of labour between a class of direct producers and a class of non-labourers;
>
> 2. appropriation of surplus labour by right of citizenship. This ensures an articulation of the levels of ancient social formations in which politics occupies the dominant place;
>
> 3. limited development of productive forces. The predominant form of labour process is that of the independent peasant producer but the intervention of the ancient state may provide for the limited development of more complex forms of cooperative labour process under conditions of slavery and even of wage labour (1975:84).

4. The Slave Mode of Production[1]

The Slave Mode of Production appeared as the development of and the destruction of the Ancient Mode of Production in

[1] Here I follow Hindess and Hirst (1975:125-129) in close paraphrase.

ancient Greece and Rome. Slavery was a system of social production. Under this mode of production, the workers, as slaves, became the essential means of production. Hindess and Hirst found three levels of relations of production in this mode: the form of property/legal definition of agents, distribution of means of production, and the mode of appropriation of the surplus.

A social formation dominated by this mode of production is characterized by a social division of labor into non-laborers and laborers, and by private property relations. Here, the laborers (i.e., slaves or direct producers) are the legal property of the non-laborers (masters). As chattels, they have no legal or social existence independent of their masters and are dependent on him for their sustenance. Slaves are used in household and factory works and in farming. They were the basis of production in ancient Greece and Rome and in 17th and 18th century America. The whole product of the slaves would go to the slave owners. Hence, the appropriation of the surplus product was a function of the slave being the property of his owner (1975:125-29).

5. The Feudal Mode of Production

Medieval Europe represents the typical example of the Feudal Mode of Production. It is characterized by an organization of society into two classes: the landlords and serfs and tenants. As a matter of right, the landlords appropriate the surplus

product of the direct producers (Amin 1976:15). Thus the relations of production, here, are those which regulate the appropriation of land and its products. Under this mode, the means of production is essentially owned by the feudal lords. According to Godelier, feudal structure presents two characteristic features: "the lord's ownership is effective but not absolute, since he himself belongs to the feudal hierarchy of lords and is the vassal of an overlord who has ultimate, if not effective, ownership of the land (1978:227)". The peasants were grouped together in the village communities on their lord's lands. They were subject to compulsory labor and to rents in kind or money. The feudal system evolved out of the development of exchange, towns and commodity production. It laid the foundation for capitalist relations of production (Godelier 1978;227).

6. The Capitalist Mode of Production

Here we shall continue briefly our theoretical enquiry into modes of production by examining the essential features of the Capitalist Mode of Production. This mode of production is characterized by three basic features:

> ...(1) the whole social production takes the form of commodities; (2) labour power itself becomes a commodity, which means that the producer, having been separated from the means of production, becomes a proletarian; and (3) the means of production themselves become commodities, in which is materially embodied a social relationship, that of their exclusive appropriation by a particular class--- in other words, they become capital (Amin 1976;60).

Therefore, the production of goods and services under capitalism takes the form of commodity. This means, first, that production takes place for profit or sale in the market rather than for direct use by the producers. Secondly, we find the existence of two antagonistic classes under the capitalist mode: a class of capitalists who own the means of production and a class of propertyless workers who work for the capitalist in order to earn their subsistence. Since they do not own the means of production, they have no other way to survive but to sell their labor power to the capitalist for wage or salary. Hence, under the capitalist mode, labourers themselves turn into commodities, which are then dependent on supply and demand in the market for labor. Thus, all production in the Capitalist Mode of Production is commodity production in its general basis and we also see the transformation of labor power itself into a commodity in particular. More precisely, it is the capitalist and not the workers who control and manage the process of production itself. Consequently, the workers are deprived of control of their works and of their product. Complete separation of producers (wage-workers) from the means of production is another characteristic of capitalism. Here, the capitalists as a class have an exclusive monopoly on the means of production while workers have only labor power. Thus the objective of capitalist mode is to expand their capital by combining labor and means of production and selling commodities for profit. Under this condition, the worker is free to change

his employer while the employer is free to hire and fire the workers. This implies that their relation is purely contractual, with no direct coercion involved (Edwards et al 1978:41, 75-76).

Chapter III

The Green Revolution

1. The Meaning of the Green Revolution

The term "Green Revolution" was first used by William S. Gaud, former Director of USAID in a speech in 1968 at the Society for International Development (Bhagaban et al 1973:3). The phrase "Green Revolution" bears a number of meanings. Thus, Pearse (1974) found a number of alternative uses of it with a warning that there is no official or correct version. These are as follows:

a. A breakthrough in plant-breeding:

The "Green Revolution" has a special meaning amongst agronomists in which it refers to the scientific achievement of the plant-breeders who have made genetic improvement of existing varieties of food-bearing plants and have elaborated ways of creating new varieties embodying "bespoke" traits in regard to physical plant-structure, photosensitivity, length of vegetative cycle, response to fertilizer, nutritive qualities, resistence to pests and disease, color, and even taste and consistency. The "manufactured" plant like this is indeed a revolutionary development in plant biology. Thus, the yields of foodcrops can be increased, a higher protein content can be bred in and foodcrops can be developed in a difficult natural environment.

b. A breakthrough in technology;

The phrase "Green Revolution" also refers to a particular technology based on these new varieties of grain used in combination with much heavier doses of chemical fertilizer, pesticides, tractors, combine harvests, etc. The agronomists and agricultural economists have frequently given this meaning to the "Green Revolution". They point to the revolutionary increase in yields and in production within a given area, mainly using heavier doses of fertilizer and producing two or more crops in a single year on the same land,

c. A breakthrough in development strategy:

The third meaning of the "Green Revolution" is associated with neither the scientific breakthrough nor the technology but a particular economic policy for growth based on the exploitation of this new technology for increasing agricultural production. It has been proposed as an alternative to land reform where the land is concentrated in a few hands. It promises to prevent agrarian tensions resulting from unequal distribution of land by generating increased production, leading to an increase in the circulation of consumer goods. To some American economists the "traditional" agriculture of Third World countries suffers from a paucity of resources and unproductive technology. To bring about its development it is, therefore, necessary to provide new and more productive technical inputs to peasant cultivators at a cost which is very low in order to bring about the fundamental goal of a jump in profits. Thus the phrase connotes a specific policy of maintaining political

stability and this implies keeping the status quo intact (Pearse 1974:386-387).

According to Griffin, "The expression'Green Revolution' is a loaded term, a political slogan" (1974:2), which suggests a major breakthrough in agricultural production. This, also, implies that technical change is an alternative to political change and this change can be made peacefully without any institutional reform. He says that these are all misleading and reality is quite different from current rhetoric. Unlike Pearse (1974), Griffin also found two meanings of the "Green Revolution". First, it refers to a "broad transformation of the agricultural sector in underdeveloped countries to a reduction in food shortage and undernourishment (1974:2)". Secondly, it refers to specific plant improvements (noteably the introduction of high yielding varieties of wheat or rice), sometimes called "Miracle Rice" (1974:2). Byres, one of the critics of the "Green Revolution" called this "new strategy" an "assertive expression, which is the most explicitely ideological of all the cant phrases spawned in the development field (1972:100)".

2. Styles of Rural Development

Griffin (1974:198-203) has categorized three distinct strategies or approaches to development in general and rural problems in particular: the technocratic strategy, the reformist strategy, and the radical strategy. (See Table 1.)

According to technocratic strategy, the prime objective is to increase agricultural output, either by incorporating more conventional inputs such as land (as in Brazil) or encouraging farmers to adopt an imported technology (as in the Philippines and Pakistan). The economy is conceived in terms of liberal capitalist ideology (free market, competition, respect for private property, etc.). Here the landed property ownership is concentrated in a few hands, and the dominant land tenure forms are found in latifundia, plantations, large private and corporate farms and various types of tenancy arrangements.

The reformist strategy is basically a compromise between the two extreme positions. Here, inconsistencies in government policy exist, since it does not in fact do what it claims. This style of strategy places priority on redistributing income to some sections of the community. It promises greater equity with faster growth by changing agrarian institutions. Here, government reform attempts remain partial, fragmented, incomplete, and concentrated in a few limited regions. As a result, this creates a dualism or bi-modal agricultural sector. The ideology in this style is nationalist or sometimes populist. The dominant

Table 1

Styles of Rural Development

Development Strategy	Objectives	Major beneficiaries	Dominant form of tenure	Idealogy	Representative countries
Technocratic	increase output	landowning elite	large private and corporate farms, plantations, latifundia, various tenancy systems	capitalist	Philippines, Brazil, Ivory Coast
Reformist	redistribute income (and wealth); increase output	middle peasants, "progressive" farmers	family farms, cooperatives	nationalist	Mexico, Egypt
Radical	social change; redistribute political power, wealth and output	small peasants and land-less labourers	collectives, communes, state farms	socialist	China, Cuba, Algeria

(From Griffin 1974:204)

land tenure institutions are family farms or cooperatives. The major beneficiaries of this strategy are the middle peasants on family farms, large progressive farmers (with substantial holdings, they may be of urban origin such as retired army officers, civil servants and politicians). The redistribution of incomes takes place from the upper income groups to middle income groups. The lower income groups do not receive much benefit except some employment.

Finally, the first objective of the radical strategy is to achieve rapid social change and a redistribution of political power. The next step is to redistribute wealth and income through higher production. The main ideology of this strategy is socialism. "It is based on the assumption that it is possible to mobilize an untapped resource potential, namely human labor (Griffin 1974:202)". This can be done by extending the number of days worked, increasing the intensity of effort and raising the efficiency and inventiveness of labor. Here, rough equality can be achieved by abolishing private property in land and establishing collective communes or state farms. Subsequently this tends to favor small peasants and landless laborers. Greater emphasis is placed on the immobility and specifity of resources, and of exploiting the unique local opportunities. This style is followed by China, Vietnam, Cuba, Russia, and other socialist countries.

If we consider the above three styles in terms of mode of production, we will find actually two kinds of rural development: radical strategy on the one hand and the technocratic and reformist strategy on the other. More precisely, under either the technocratic

or the reformist strategy, the ownership of means of production are exclusively concentrated in a few hands. Secondly, we find the continuing existence of two classes (landlords, capitalist farmers and landless laborers, wage workers, share croppers, small holders). Here the major beneficiaries are those who own the means of production. The reformist strategy raises the progressive slogan (socialism) only to gain popularity. The socialist slogan, nowdays in Third World Countries, is so popular that most of the political parties keep this in their very agenda in order to gain political power.

3. The Green Revolution as a Capitalist Mode of Production

The "Green Revolution" bears every qualification to be identified as a capitalist mode of production (some may argue it is a part of the capitalist mode of production dominant in the world today). The following arguement can be put forward in favor of the above proposition that it is a capitalist mode of production.

In pre-capitalist agriculture[1], the main agricultural inputs consist of natural fertilizers (such as animal and human refuse, decayed trees, etc.), local varieties of seeds, water (from indigenously developed irrigation systems) and so on. Starting from ploughing (animal drawn plough) and proceeding through harvesting, all work is done by manual and animal labor. The kind of technology used comprises little more than wooden/iron ploughs, axes, sickles, and animals (oxen, horses, buffalos, etc.). In this condition, a peasant does not require very much capital, but does need more manpower. But what do we find in capitalist agriculture? In capitalist agriculture, modern inputs come under the headings of farm machinery (tractors, combines, harvesters, etc.), fertilizers and pesticides (chemical fertilizer). Acquiring these in capitalist agricuture requires substantial financial

---

[1] I prefer to call it pre-capitalist rather than traditional, since I do not feel that the many varieties necessarily would become capitalist if their indigenous development were - or had been - unimpeded by intrusive capitalism.

inputs (farm credit, capital, etc.) as well as, for fertilizers and pesticides, continuous research. This research involves the agricultural research centers and the universities. Nowdays, most of the research is conducted by private corporations (such as the Rockfeller and the Ford Foundations as mentioned earlier). Thus, behind the capitalist farm is the whole array of capitalist industry, finance, and research.

Secondly, the HYV seeds can be provided only in the limited regions of an underdeveloped country which are assured of ample water supply and serviced by irrigation works. Moreover, with the HYV seeds come fertilizer and pesticides. Although high production is believed to create profit possibilities of an unprecedented kind within those limited regions, it is only the rich peasants who get the major benefits because only they can afford the expenses.

Thirdly, a capitalist mode of production requires increase in working capital. This requirement is brought about by the new seeds, the needs for fertilizers, water, pesticides -- a "package" that cannot be split, but which will create new profit possibilities. Therefore, access to the "Green Revolution" is confined to those cultivators who are fortunate to possess initially large personal resources and access to credit on reasonable terms. On the other hand, the small peasants and the share-croppers are deprived of these facilities because of lack of resources, lack of capital, and lack of access to credit facilities. The more one's resources, the more credit one can secure (Byres 1972:104).

Fourthly, there will be a great possibility (and this has happened) of eviction of share-croppers by rich peasants and land owners, so that larger tracts of land may be brought uniformly under the "Green Revolution" regime. But if there is any difficulty in ejecting the share-croppers, it may lead to a change from semi-feudal relationships to a capitalist mode of exploitation in a number of ways: (1) the landlords may take greater direct interest in cropping patterns by investing large amounts of capital and at the same time extracting a far larger share, or (2) they may attempt to buy more lands or to lease additional land, thus displacing the small tenants and share-croppers from direct productive activities (Billings et al 1970b; Ladejinsky 1969b; Lewis 1970; Lockwood et al 1971; Manu 1968; Rudra 1971; Sau 1971; Sengupta et al 1968; Vyas 1970; and Byres 1972). Finally, the shift towards capitalist agriculture is characterized by high rates of capital formation, a marked tendency towards mechanization, and new class relations.

Forces and Relations of Production:

Under capitalist farming, there should be a greater tendency towards mechanization in the rural areas of the Third World. This sector (rural sector) is characterized by the presence of capitalist farmers amidst poverty, labor-surplus, capital-scarcity, and an underdeveloped economy. The new inputs in agriculture may create a high demand for labor at peak seasons. This may result in dramatic increases in wages at those periods and it will inevitably lead towards unionization of the laborers. Consequently, unionization

may create more labor troubles and disputes. Logically, there should be more option for mechanization in order to minimize the risks of labor troubles, shortage of labor and increase of wages at those peak periods. Establishment of cooperative credit societies, which provide loans at a very reasonable rate of interest only to those who have lands and resources, may push the big landowning classes towards mechanization. A further arguement in favor of mechanization is that it is land-saving in a land-scarce situation in two senses: first, land formerly used for growing fodder for work animals will be released and made available for growing cash crops. Secondly, mechanization allows land to be cultivated more intensively. Therefore, capitalist farmers will try to mechanize for maximizing profits on their lands (Byres 1972:106).

How is production organized under mechanized cultivation? To get the answer, we need to get down to the individual activities in the agricultural cycle. Ploughing by tractor is the first task of mechanized agriculture. After ploughing, it requires seed bed preparation which includes planking, levelling, application of farmyard manure, bunding and water course-making. The next step is irrigation via pump sets. This can save time required for irrigation and allows the cropping intensity to rise. Finally, mechanical reaping, threshing and crushing represent the major activities in mechanized cultivation. The whole process is highly

labor-saving and time-saving. This may remove labor problems very effectively (Byres 1972:107).

This "new technology" may create new kinds of social relations in the rural areas of underdeveloped countries. Under a capitalist system, the basic means of production are owned by the capitalists. On this principle, the "Green Revolution" technology will be monopolized by the rich farmers and landlords in the rural areas of underdeveloped countries. Therefore, inevitable contradictions will emerge between the rich farmers and landlords on the one hand and the share croppers, small holders and landless laborers on the other.

4. Historical Background of the "Green Revolution"

Dr. Norman Borloug (as mentioned earlier), a plant-breeder, was awarded the Nobel Prize for Peace in 1970 for his outstanding work in Mexico and in India on new "High Yielding Varieties" (HYV) of wheat. Any careful observer may ask why Dr. Borloug has received the prize for peace, not for botany. According to Cleaver, it was perhaps because the "Green Revolution" was far more important to the Nobel Prize Committee than agronomy and genetics (1974:172). Since 1970, the "Green Revolution" has become a jubject of much discussion amongst social scientists, agronomists, officials, politicians, and journalists.

But the actual date of its beginning goes back to 1943 when the Rockfeller Foundation sent a team of agricultural experts to Mexico to set up a research project on local grains. Mexico was chosen for two reasons. To help to prevent the possible influence of Nazi Germany on Mexico and to move to recover the expropriated Rockfeller's Standard Oil of New Jersey from the Mexican Government. By 1951, the Project had developed a new wheat/fertilizer package (rust-resistant wheat) that gave high yields in the newly opened irrigation lands of Mexico's north-western deserts. This generated a rapid growth in overall wheat yields, which rose from 770 pounds per acre in 1952 to 2,280 in 1964. In the newly irrigated lands, yields climbed to over 2,900 by 1964. This increase and expansion of acreage caused a dramatic jump in total wheat production throughout

the 1960's. Mexico, a net importer of wheat, achieved "self-sufficiency" by the 1960's and began to export a portion of her crops. Since the 1960's, the Mexican research project has grown from a small team to a large organization -- The International Center for the Improvement of Corn and Wheat (CIMMYT). It has become the nucleus not only of international research but also of the training of the Third World technicians. The success of Mexican research soon led the Foundation to focus its concern on agricultural development in the Far East (Cleaver 1974:172-173; George 1976:114).

While the United States Congress was interested in finding solutions to the problems of hunger and social unrest in the Third World, the Rockfeller Foundation was already working hard (setting up a new research program) to find those solutions. In 1953, John D. Rockfeller III set up the Agricultural Development Council (ADC) to provide training of foreign (mainly Asians) agricultural economists and managers. It was also intended to complement the CIMMYT technicians with higher level technocrats who would be trained in the United States universities or by ADC financed professors for the United States. The main expectation was that these students would take over agricultural policy formulation in their home countries and give a distinctive character to the rural economy compatible with techological change and social stability. In the same year, John D. Rockfeller III made a survey trip to the Far East with Dr. William Myers, Dean

of the Cornell University School of Agriculture, to establish the feasibility of setting up new programs. After his return, ADC advisors were sent to Asia to set up new research programs in the universities and to recruit promising young students for training. Though the ADC is small and supports few students and teachers, it was strengthened together with the Foundation's fellowships and AID training, which helped to coordinate the agricultural development strategy and foreign student training for South and South-East Asia. During the same period, the Ford Foundation was also very active with agricultural development strategy in Asia -- mainly in India. The Foundation went with money and people into the Indian Community Development Program and began to support agricultural research and education. The Rockfeller Foundation also started working in India by sending experts to work on corn and sorghum (Cleaver 1974:175).

During the American (ADC, Ford and Rockfeller Foundation) presence in Asian agriculture and Asian universities, there were open struggles for power in Asia (Indo-China, Korea, The Philippines, Malaysia) between the "communist" and the American troops. It was against this background that the Rockfeller Foundation and the Ford Foundation decided to expand their agricultural research operations in Asia. In 1960, the Intensive Agricultural District Program (IADP) was set up by the Ford Foundation with the approval of the Indian government. This project focussed its attention on the most modern, the most credit worthy and the richest farmers in the most

prosperous regions and subsequently laid the foundation of the "Green Revolution" in India. In 1961, the Rockfeller Foundation also created a new research program to study millet in India. In 1962, these two foundations jointly founded the International Rice Research Institute (IRRI) in the Philippines. This new project became the largest and best financed of all. It gave results even more quickly than the Mexican project. Within three or four years, "miracle" rice production was boosting yields in the Philippines. These new rice varieties were dwarf and had similar requirements for fertilizer and irrigation to the HYV wheats. Like the Mexican project (CIMMYT), young promising students were also trained at the Philippines IRRI Project. These students and teachers trained at the IRRI, the CIMMYT, the country projects under foundations, the AID, and the ADC, and formed a category of highly trained individuals essentially constituting new elites in the Third World. Thus, an international team of experts has been created to spread the seeds and policies of the "Green Revolution" throughout the Third World countries (Cleaver 1974:175-76; George 1976:114-15).

Due to lack of government financial support and lack of new technology for agricultural development, much of the IADPI work in India was crippled prior to 1966. The change came in 1966 when President Johnson announced the policy of the future shipments of "food for peace" under PL480 (Public Law). This policy would be applicable only to those countries who would be willing to give

emphasis to agricultural development, population control programs, and open their doors to interested United States investors. This new policy was first applied in India during the droughts and famines of 1965-67. At this crucial moment in India, United States capitalism was knocking at the door with plans for new fertilizer plants and demands for control over prices and distribution. Fearing social unrest at home and tempted by the offer from abroad, the Indian Government opened its doors through which flowed United States capital -- and most of the "Green Revolution" (Cleaver 1974:176).

Since 1966, the efforts of the international team and the results of the "Green Revolution" have been mixed. Today, Mexican wheat cultivation is almost 100 percent under HYV. The team and the new technology also have succeeded in expanding the Third World area under new wheat grains from some 23,000 acres in the 1965-66 crop year to about 24,664,000 acres in 1969-70 (see table 1). Cultivation of new rice varieties expanded from 18,000 acres to 19,250,000 acres in the same period (see table 11). The largest amount of lands came under this regime in India, Turkey and West Pakistan (now Pakistan) for wheat, and in the Philippines and India for rice. Approximately 46 percent of West Pakistan wheat lands and 43 percent of the Philippines rice lands have been utilized for the HYV. India and Pakistan have increased wheat production from 4.8 percent and 9.7 percent respectively in 1963-65 to 10.2 percent and 18.6 percent during the period 1967-70. The rice production in the Philippines has

risen from 2.9 percent to 8.4 percent during the same period. It is true that the overall production of rice and wheat increased in these three countries, but the total food output throughout the Third World has been much less impressive. As a whole, only about 17 percent of wheat and 8 percent of its rice acreage have been affected throughout the Third World (Cleaver 1974:178).

A study of seven years of operation of the "Green Revolution" is also available from the account of Susan George (1976), a participant of the World Food Conference of Rome in 1974. Thus she says:

> In the space of only seven years (1965-6 to 1972-3) wheat acreage planted in UDCs to HYVs went from not quite 10,000 hectares to over 17 million; rice surface, beginning at 49,000 hectares in 1965, reached nearly 16 million in 1973. During some years as many as 6 million new hectares were added to the total. Beneficiaries of green revolution wheat were headed by pioneer Mexico, followed by India, Pakistan, Turkey, in that order; with smaller surfaces planted to HYVs in Afghanistan, Nepal and North Africa. Taiwan, the Philippines, Sri Lanka and again India planted most of the new rice strains. Areas with particularly favourable climates witnessed increases in yields as high as 50 per cent (George 1976:115).

Table 2

Extent of Spread of New Wheat Varieties

Country	Year	HYV[1] (acres)	Total[2] (acres)	HYV as %
Afghanistan[3]	1968/69	360,800	5,199,000	6.9
India	1969/70	15,100,000	41,066,000	36.8
Nepal	"	186,500	494.000	37.8
W. Pakistan	"	7,000,000	15,361,000	45.6
Iran	"	222,400	11,609,000	1.9
Jordan	1968/69	230	405,000	0.1
Lebanon	1969/70	4,200	148,000	2.8
Turkey	"	1,540,000	20,995,000	7.3
Algeria	"	12,400	5,311,000	0.2
Morocco	"	98,800	4,792,000	2.1
Tunisia	"	131,000	2,717,000	4.8
Guatemala	"	7,400	99,000	7.5
Country Total	"	24,664,000	108,397,000	22.8
Capitalist Third World Total	"	24,664,000	145,644,000	16.9

---

[1]HYV acreage from Dalrymple, Imports and Plantings, pp. 9-10

[2]Total acreage from FAO, Production Yearbook, 1970. These data were used instead of Dalrymple's because they allow direct calculation of Capitalist Third World total.

[3]Afhanistan data in Dalrymple dated inconsistently, so above figures may not be correct (pp. 9 and 35).

[4]Capitalist Third World: South America, plus Guatemala and Honduras, plus Asia, plus Africa

(from Cleaver 1974:177-178)

Table 3

Extent of Spread of New Rice Varieties

Country	Year	HYV[1] (acres)	Total[2] (acres)	HYV as %
Ceylon	1969/70	65,100	1,620,000	4.0
India	"	10,800,000	93,119,000	11.6
Nepal	"	123,000	2,964,000	4.1
Pakistan	"	1,890,700	29,640,000	6.4
Burma	"	355,900	11,856,000	3.0
Indonesia	"	1,850,400	20,345,000	9.1
Laos	"	4,940	2,223,000	0.2
Malaysia (West)	"	316,000	1,272,000	24.8
Philippines	"	3,345,000	7,842,000	42.7
S. Vietnam[3]	"	498,000	6,224,000	8.0
Country Total	"	19,250,000	177,105,000	10.9
Capitalist Third World Total[4]	"	19,250,000[5]	233,148,000	8.3

[1]HYV acreage from Dalrymple, Imports and Plantings.

[2]Total acreage from FAO, Production Yearbook, 1970.

[3]What these figures represent is anybody's guess!

[4]Capitalist Third World taken from FAO classification: North and Central America (minus Cuba and the United States), plus South America, plus Asia (minus Taiwan, Japan, North Vietnam), plus Africa.

[5]Probably understated due to development of unreported new varieties; e.g., in Thailand.

(from Cleaver 1974:177-178)

Chapter IV

The Green Revolution in India

1. The Nature of the Mode of Production in Indian Agriculture

The concept of "articulation" of modes of production has created considerable controversy among scholars[1]. There are still many who, however, reject the idea of "articulation" or even modes of production. For many scholars, dependency theory is still a preferred method of investigation for explaining the phenomenon of underdevelopment. Alavi (1975) is one of the critics who rejects the idea of "articulation", especially in regard to the question of the mode of production in Indian agriculture. Therefore, it is necessary and useful for our purposes to examine this issue briefly[2].

---

[1]Very recently, Marxist scholars have given serious consideration to the concept of "articulation" of modes of production in the theories of development and underdevelopment. The main argument of this concept is that the capitalist mode of production has articulated all the pre-capitalist modes of production and, as a result, it has created underdevelopment in the Third World. Originally, the concept came from Reading Capital, by Althusser and Balibar. It has gained much popularity among some Marxist anthropologists (Meillassoux, 1972; Terray, 1972; Rey, 1971; Bradby, 1975; Luxemburg, 1951; Foster-Carter, 1978, and many others). However, it is beyond our scope to discuss them in detail.

[2]A brief discussion of different Indian scholars is necessary, although we are not concerned at the theoretical level with the concept of "articulation" of mode of production in Indian agriculture.

Whether a particular sector of Indian agriculture is feudal or capitalist raises serious problems for many scholars. Ashok Rudra (1970) first started the debate; using a narrowly statistical method of analysis, he asserted that there is no significant capitalist class in the countryside of India, and hence there must be feudalism. Utsa Patnaik (1970, 1971, 1972) agreed with him that there was no tradition of capitalism in the Indian agriculture and that it has developed very recently. She criticizes Rudra's theory, however, and argues that the colonial economy in terms of "articulation" was a "unique transitional structure which is the outcome of colonialization and integration into the world capitalist system of a pre-capitalist economy (cited by Foster-Carter 1978:70)". Endorsing Patnaik, P. Chattapodhyay (1972a, 1972b) argues that in principle once there develops generalized commodity production and landless laborers, capitalist relations must be recognized to be present. On the other hand, Banaji (1972) developed a theory of a distinctive colonial mode of production. He found not "pure" capitalism but a hybrid system of the relations of exploitation in Indian agriculture. D. McEachern (1976) surveyed critically the whole debate and detected four elements within Indian agriculture that were central to the issue: generalized commodity production, free wage labor, the entrance of capital into production and the significance of tenancy relations. Unlike Rey's concept of "articulation" (1971), he sees the possibility of a combination

of different modes of production. In fact, for the Indian situation, he rejects both the ideas of "articulation" and of a "colonial mode of production". Rather, he gave emphasis to a "constricted" form of capitalism specific to India and conncected with the international capitalist system. The notion of international capitalism is also crucial for Alavi (1975) who argues that the impact of imperialism disarticulated the pre-colonial Indian economy and then reintegrated with the metropolitan economy.

However, many interesting issues have been raised by Indian scholars[1] in the debate over modes of production in Indian agriculture, and especially in relation to the changes that have occurred in recent years following upon the introduction of the "Green Revolution".[2]

With the formal termination of British colonial rule in India (1947), American influence grew steadily. India became heavily dependent on United States aid, though she had also links with the U.S.S.R. But the United States has played an important

---

[1]Most of the contributions have been published in the quarterly supplements Review of Agriculture of the Economic and Political Weekly (please see references cited).

[2]It is tangential to the scope of this essay and not immediately relevant to argue whether Indian agriculture is colonial or capitalist, although my focus upon the Green Revolution in India may case some light upon the analytical problem.

Map 1

From Frankel (1971:2)

The Regions of India's Green Revolution

role in shaping the Indian economy since independence. During the early sixties, American experts, sponsored by the Ford Foundation, have recommended a major shift in policy towards agricultural development. This shift moved from the policy of community development to an emphasis on technological solutions to problems of agricultural development within the existing social structure. Thus, the "Intensive Agricultural Development Program" (IADP) emerged; it is commonly referred to as the "Package Program". It gave emphasis to immediate increase in agricultural production, to the criterion of the profitability of the big farm as an enterprize. and to a new provision of physical inputs and credit facilities to rich farmers and landlords. Thus, under this plan, farmers needed to have fertilizer. new seeds, pumps for tubewells, a variety of farm machinery, and large amounts of credit to buy these new inputs (Alavi 1975:165). This strategy for agricultural development has provided the background for the rise of the capitalist mode of production within Indian agricuture (especially the "Green Revolution") during the last two decades. But the question remains: to what extent and with what success and with what costs (especially social) has this strategy been applied?

2. The Green Revolution in Operation

During the years 1965-67, the failure of monsoon rains in India caused severe damage to the crops. Famines swept over the rural areas, causing death to many thousands of people and cattle. To prevent unrest only in the cities, the government supplied grains held in government storage depots and grains imported from abroad. The villages were neglected and the authorities suppressed the news of death and starvation in the countryside (Bhagaban et al 1973:3).

The terrible droughts ended in 1968 with the reappearance of the monsoon rains. By the year 1967-68, as mentioned earlier, the United States and the Food and Agricultural Organization of the United Nations agencies had succeeded in persuading the Indian government to distribute the HYV seeds (also known as Mexican Dwarf Wheat) to the farmers in the Punjab and Haryana states. The monsoon rains, combined with the sowing of the HYV wheat, led to an increase of 3.8 million tons in wheat production over the pre-drought figure of 10.7 million tons. This increase in wheat production had a deep impact on the Northern states of Punjab, Haryana and Uttar Pradesh. But the rest of the states in India were not benefitted by this increase. Nevertheless, the United States and the Food and Agricultural Organization of the United Nations agencies gave out such extensive publicity that the impression that a "Green Revolution" had taken place was widely created in the world media.

The monsoon failed again in 1972 over vast areas of India. Once more India experienced a terrible famine. Despite government restrictions on the news media, the newspapers were reporting the news of deaths and starvation from all over the rural areas. In the same manner as in 1965-8, the towns were well looked after and villages were neglected. Thus, one may wonder why famine occurred again dispite increased food production during the period 1968 to 1972! (Bhagaban et al 1973:3).

Before the introduction of the HYV seeds, the South and Southeast Asian countries had depended on locally improved varieties (LIV) of rice. These LIV had led over two decades to steady increase (if not dramatic like the HYVs) in production of rice. The LIVs did not receive much publicity in the mass media, in contrast to HYVs. These local varieties are far less disease prone than HYV. They require less irrigation, less chemical fertilizers and are quite agreeable to customers' tastes. From 1955 to 1956, India had used locally improved varieties of seeds. During this period the annual overall growth rate of food grains production was about 3%. From 1967 onwards, the overall rate rose to 5% due to introduction of HYV seeds for wheat and rice (Byres 1972:99). This extra increase of 2 percent did not have significant impact on the real income of the people nor could it raise the standard of living of the vast rural population. On the contrary, the income of the landless laborers and small farmers went down by 20 percent during the period 1966-71. Rich farmers and the

bourgeoisie from the towns who had invested money in agriculture were the major gainers in this gamble (Ladejinsky 1969; Frankel 1971; Rudra 1971; Bhagaban et al 1973:4).

In the two year period, 1968-69, 32 percent of wheat acreages and 7 percent of rice acreages in India were planted with HYV seed. The major wheat cultivation took place in the states of Punjab and Haryana, where 60 percent of the acreage was under the HYV seeds. Only in these two states has a remarkable increase of production taken place and primarily because of the rich alluvial soil and the assured irrigation throughout the year -- and both conditions were present, of course, well before the appearance of HYV! Sixty percent of India's rice production comes from areas where no tubewell or canal irrigation exists and the rice farming depends entirely on rainfall. To introduce the HYVs in these areas, the first task is to dig vast numbers of tubewells and canals for irrigation. There is little hope that India's Ministry of Agriculture and Administration can cope with this problem. HYV rice has also been introduced within the small areas of Andhrapradesh and Tamil Nadu, especially in the district of West Godavari and Thanjavur. These districts lie between the deltas of the Godavari and Couveri rivers where irrigation facilities are abundant. By 1971, the combined use of HYV and the LIV in the Thanjavur District led to an increase of 40 percent in the rice production per acre per year over the figures for 1964-65. It is

very interesting to note, however, that the IR-8 (a type of HYV rice) failed to capture the Indian rice market because rice consumers dislike its taste, texture, and even smell. On the other hand, the CO-25 (LIV) became very popular and has already ousted the HYV IR-8 from many rice growing areas in South India (Frankel 1971; Bhagaban *et al* 1973:4-5).

3. Capitalist Farming in India

In 1969, the Union Minister for Transport and Shipping of India said, "...capitalist ideas and, more important, capitalist psychology are not only alive and afloat but also seem to be having a field day (Byres 1972:104, c.f. Amrita Bazar Patrica, Jan. 1969)". The new strategy which has produced the "Green Revolution" has made effective penetration in the Third World subsistence agriculture. It has given firm roots and sustenance to the growth of a capitalist mode of production.

But so far only a few states[1] in India have been benefiting from the "Green Revolution". In these states, the:

> ...rich peasant and even some "gentlemen farmers" react to the possibility of large profit in a number of ways which suggest that a qualitative change is taking place: a shift from one mode of production (which we may loosely describe as semi-feudal) to another (capitalist agriculture) (Byres 1972:104).

Byres further argues that the capitalist mode of production is still not yet the dominant mode of production in rural India in a qualitative sense. It is, however, dominant in the sense that it contains the major sources of growth (Byres 1972:104).

Capitalist farming in India was, in fact, much in evidence if not dominant by 1953-54. That was demonstrated by S.C. Gupta's

---

[1]Punjab (Ludhiana, Haryana), Andhrapradesh (West Godavary), Tamil Nadu (Thanjavur), Kerala (Palaghat), West Bengal (Burdwan).

study (published in 1962). Gupta provides the following data (cited by Alavi 1975:167):

Size of Holdings	Percentages of Households	Percentages of Area Owned
Below 5 acres	74.73%	16.32%
Above 10 acres	12.77%	65.26%

Analysing Gupta's data, Alavi notes that the distribution of other farm assets was in similar unequal proportions. The lands of the extremely small holdings was largely being taken over by big farmers who operated on a commercial basis. No less than 60 percent of the rented area was in the hands of the big farmers who owned more than 10 acres, whereas poor peasants with less than 5 acres had no more than 20% of the rented area. Alavi (1975) identifies three categories of farmers from Gupta's study of the Indian countryside:

1. Capitalist Farmers

Their cultivation is mainly based on hired labor and investment of capital and they rely on 50 percent of wage labor in their organization. They produce essentially for profit and for market. These capitalist farmers have "drive", technical skill and capital to obtain maximum productivity at minimum costs.

2. Market-Oriented Large Family Farms

These farmers undertake cultivation with the help of family labor and some employed laborers. The produce substantial marketable surplus and are therefore market oriented. They own

land between 10 and 20 acres and market at least 5 percent of their output. They account for about 18 percent of the operational holdings, hire one-third of their labor, and invest a small amount of capital.

3. Small Holders

At the bottom of the hierarchy in terms of land ownership, the small holders account for about three quarters of all holdings in India. They barely produce their subsistence with little or no surplus for market. They suffer more than they benefit from the high prices of agricultural commodities. Therefore, they usually have to depend on other subsidiary occupations (Alavi 1975:167-168).

Since 1953-54, the trend towards the extension of capitalist farming has greatly accelerated due to application of modern inputs of the "Green Revolution", and the result has been widespread displacement of share croppers from their tenure and a corresponding increase of wage laborers. This transformation of Indian agriculture seems to be quite dramatic. During the last few years, the number of tractors in use went up more than five times, that of diesel and electric pumpsets five times, and tubewells increased almost thirty-eight times. Fertilizer consumption increased everywhere, and the total area under the HYV seeds increased eleven times. This surely indicates a massive change in Indian agriculture (Alavi 1975:169).

4. Mechanization of Agriculture in India (Forces of Production)

Empirical studies of scholars (Billings et al 1969a, 1969b, 1970a, 1970b, 1970c; Ladejinsky 1969a; Chopra 1972; Byres 1972, and many others) suggest that a great deal of mechanization has very recently taken place in Indian agriculture. In the Punjab and Haryana provinces alone there were 25,000 tractors in 1970 compared with 8,000 in 1961. These were operated by the large farmers owning 30 acres or more. In 1970, 24 percent of the irrigated land was under tubewells and pumpsets; 50 percent of the total wheat crop was mechanically threshed. In 1970, there were 100,000 mechanical threshers in use compared with 5,000 in 1964 (Billings et al 1970b: A66-A67). Billings et al predicts that by 1984, 20 percent of the gross cropped areas will be tilled by tractors, 60 percent of the irrigated lands will have pumpsets, nearly all of the wheat will be mechanically threshed and 50 percent of the wheat will be mechanically reaped (1970b: A67).

The number of tractors in India altogether increased from 31,000 in 1961 to 173,000 in 1971. This is, in fact, a modest number considering the size of the Indian agrarian economy. Nevertheless, chemical and biological technology which is accompanied by tubewell irrigation development is more prevalent than machine technology, particularly in respect of preparation of seed-bed, harvesting, etc. (which is more labor intensive) (Alavi 1975:169). Alavi further suggests that in spite of using tractors (which

directly affects the relations of production):

> We may consider the elements of mechanical technology that are geared to the increased supply of water as a separate category along with inputs that embody chemical technology (and the biological technology of the new seeds) which affect yields and do not displace labour (1975:169).

In favor of his arguement, he says that the number of tubewells went up by the greater percentage compared to tractors, increasing from 19,000 in 1961 to 718,000 in 1971. Fertilizer consumption went up by 300,000 tons in 1961 to 2.8 million in 1971, and the area under the improved varieties of seeds rose from 2 million hectares to 23 million hectares out of 350 to 400 million acres all over India (1975:169).

Table 4

Mechanization and Employment on 28 Wheat Farms in the Punjab, India

		Tractor Farms	Non-Tractor Farms
1.	Number of holdings	6	22
2.	Average size of holding (acres)	58.86	21.08
3.	Total investment per acre (Rs.)	458.97	216.46
4.	Male employment on cultivating wheat (hours per acre)	108.90	161.20

Source: B. Singh, "Economics of Tractor Utilization -- A Case Study", Indian Journal of Agricultural Economics, January - March 1968, pp. 84 and 85.

(From Griffin 1974:68)

5. The Social Relations of Production; The Emerging Contradictions

It has already been argued that the "Green Revolution" is a capitalist mode of production. If this assumption is correct, then we can safely say that it is a dialectical process which has given birth to certain contradictions in the social relations of production in Indian agriculture. This assumption can be demonstrated if we look at the kinds of social relationships that have been produced by the "Green Revolution" in India.

In the Indian rural scene, social conditions and conflicts will be determined by the kinds of relations which emerge between rich peasant and capitalist farmers on the one hand and small peasants, sharecroppers, and landless laborers on the other. Byres (1972) recognized the dialectical nature of the "Green Revolution" which created itself via certain key contradictions. He further maintains that these contradictions:

> ...will be the "Green Revolution's" most important legacy, bequeathed through the qualitative changes (the shift to capitalist agriculture and the move to mechanization) for which it acted as midwife. The nature of the legacy .... will be the distribution of gains and the degree of polarization. These, in their turn, will depend upon the extent of dispossession and uprooting and which segments of the peasantry are so affected; which section of the peasantry have access to the "new technology", the employment pattern thrown up by mechanization and the employment opportunities available outside agriculture; the course of money and real wages (Byres 1972:108).

Within the framework of this "new strategy", rich peasants will have exclusive access to the "new technology", because the rich peasants own the basic means of production in agriculture, possess

capital, get access to credit facilities because of the "securities" they possess and because they are able to manipulate power in the countryside as well as in government departments and in the legislature. On the other hand, the ejection of sharecroppers, the increase of lease in lands and buying up of lands by the rich peasants will inevitably lead to an increase of rural proletariat, an expanding class of landless labor.

Furthermore, the mechanization of agriculture will have short and long term effects on the employment situation. In the short term, it will create high demand for agricultural labor. But later on, this will be reversed. The reason is that the indigeneous method of cultivation requires more manpower, whereas mechanized cultivation requires more and different skills and less manpower (labor saving). Therefore, mechanization will displace a considerable number and a large section of the rural population. They will be thrown out of employment and pushed to the crowded urban areas (Byres 1972:109). However, there will be a greater prospect of overall rising income for a particular class -- the rich farmer. Meanwhile, the poverty of the masses will not diminish, but will actually increase (Bardhan 1970; Dandekar et al 1971a, 1971b).

Emergence of a new power structure in the countryside is another effect of the "new strategy". It has allowed the rich

peasants and capitalist farmers to acquire more political power. They became more powerful first at the village level and then through the state legislature and finally at the center. Therefore, there will be less possibility of land reform favorable to middle and poor peasants or any lessening of the tide of mechanization. Subsequently, contradictions in the social relations will not lessen but will increase with the increasing dominance of a particular class (Byres 1972:110).

Another most serious consequence of the "Green Revolution" is the increasing rural unrest. Some observers like Cleaver (1974) and Sharma (1973) have already began to predict the "red" aspect of the "Green Revolution". Already the symptoms of rural unrest have been observed elsewhere in India during the last two decades. Sharma (1973) maintains that the extra food produced by the "Green Revolution" is not producing peace. As the agricultural fields turn greener and harvests get larger, social tensions increase. In the late sixties, there was both qualitative and quantitative change in the Indian countryside. Besides the traditional village-based conflicts between the factions of the dominant landowning groups, new conflicts emerged along class lines. It is not true that class conflict did not exist in the past in the Indian countryside: from time to time the peasants have risen against their oppressors. But these uprisings did not have cohesive leadership and class ideology (Sharma 1973:81). The present mass unrest in the countryside is to be clearly distinguished by its militant

overtones and class ideology. Thus, to quote Sharma again:

> The now well-known peasant uprising in Naxalbari in 1967 was a symptomatic outburst which set the tone and character of things to come. From one harvest to the next, from one part of the country to another. the unrest spread. It took various forms: Gandhian Satyagrahas (act of nonviolent civil disobedience), massive land-grab marches, forceful seizures of harvested crops, unionized demands for higher wages and, increasingly, the physical annihilation of landlords. The form varied, the content was the same; and in the process the line of demarcation became clearer. The otherside -- landlords, rich peasants, rentiers, paymasters -- responded differently, depending upon their strength and organization. Sometimes they fled to the cities, to return only when their allies in the state apparatus (the police, the army) made it safe for them to do so. At other times they retaliated with force. In the village of Venomani in East Thanjavur, for example, they attacked the landless labourers' hamlet at midnight. Shooting in the air, they forced everybody out of his or her house, pushed as many as they could into a single hut, and set fire to it. Forty-four people -- men, women, and children -- were burnt alive while the jubliant landlords stood guard to prevent anyone from escaping (Sharma 1973:81).

Armed attacks have increased as the farm laborers have become increasingly organized and militant. Many of the reports of unrest came from West Bengal, Kerala, Andhrapradesh and Tamil Nadu where the "Green Revolution" has been intensified. But this type of class confrontation is no longer confined to these areas. It has spread to every state in the country (Sharma 1973:81).

The "Green Revolution" has brought about large-scale eviction of share-cropping tenants (as mentioned earlier). The traditional instruments of labor (such as oxen, plow, and other traditional agricultural implements) have been replaced by American and Soviet-made tractors and other farm machinery, and the complementary employment of smaller numbers of full time wage laborers or share-croppers. The peasants who own small holdings (and who also used to rent some lands additionally), are now no longer able to do so and their small scale farm economy is no longer viable because of the insufficient amount of land available to them. They have been forced to sell their lands to the big landowners. Thus has come about general pauperisation of large sections of rural population in India. The eviction of large numbers of share-croppers from their tenancies and the displacement of full time agricultural laborers by farm machinery has caused the amount of full time employment in the rural areas to decline very considerably. The rise of a great deal of militancy in the countryside has been linked to this. On the other hand, with large increases in crop yields as well as increases in the cropped area, the demand for seasonal labor has multiplied. Thus, the traditional "semi-feudal" patron-client relationship between the landlords and the landless laborers, share-croppers, and tenants has broken down. More precisely, there was a break of ties of dependence between the landlords and their full time dependents and tenants. The rich

peasants and the landlords are now more dependent than ever before on casual labor at harvest time. Therefore, the landlords and the tenants and share-croppers have no more obligations to each other as they had before capitalist farming. Finally, due to enormous increases in the productivity of the large farms, there has been growing marketable surplus of food grains. This has brought about the increase of cash incomes and cash expenditures for the landowners, and this has contributed to the inflation in the Indian economy. Then a result of this inflation, the real incomes of the small farmers, share-croppers, landless laborers (those who could not participate in the "Green Revolution"), have actually declined in absolute terms, while the capitalist classes, both domestic and foreign, have not failed to profit from their sales and investments in agriculture. The small farmers have been compelled to sell their lands due to increasing economic and political pressures from the wealthy landowners. And this has further created the increase in the concentration of landowner-ship in India (Alavi 1975: 165-166).

6. Contradictions in the International Division of Labor: The Involvement of the Multinational Corporations in India

We have already noted that the "new strategy" is a product of capitalism (expansion of capitalist agriculture). If we accept this premise, then it will lead us to believe that the countries receiving the "new technology" and the patronizing countries have already entered into a kind of relationship which has created an international division of labor. To examine this statement, we need to investigate the kinds of relationships involved under this "new strategy". It has already been mentioned that the inputs of capitalist agriculture (farm machinery, fertilizers, etc.) are produced by the developed countries. The poor countries are not capable of producing these inputs for their agriculture. Therefore, in order to adopt new technology in the agriculture, they have to buy them from the developed countries. Now, who is going to supply all materials from the developed countries? The answer is the giant multinational corporations (MNC). Susan George maintains that only agribusiness firms can supply these inputs most efficiently and it is thus these multinational corporations which have vested interests in the agricultural revolution of the poor countries (George 1976:116).

The multinational corporations have institutionalized the transfer of technology on a global scale. By purchasing the machinery products, the poor countries are only financing

the expansion of the multinational corporations. As a result, the poor countries will spend the major percentages of hard earned foreign exchange reserves for fertilizers, tractors, pesticides, and so on. Indian experience tells us that:

> During the mid-1960's, a number of countries including India...received large loans from USAID to finance imports of sorely needed fertilizer. At the same time, the United States and the World Bank put a great deal of pressure on...the Indian Government, to encourage multinational corporations to invest in local production capacity. The Indian Government changed its policy abruptly...to permit these firms to price and distribute their products in India. Joint ventures between Indian and foreign firms were especially encouraged (George 1976: 117-118).

And again, according to Oxfam:

> Massey Ferguson sold 5,000 tractors to Green Revolution farmers in India between 1965 and 1969. Standard Oil and International Minerals and chemical corporations are selling fertilizers. Transnational corporations like EXXON, CIBA, Mitsubishi, Hoechst, and International Tractors all forecast high sales in Third World Green Revolution areas, though before the introduction of the strategy there was little or no market for their products. Besides encouraging foreign investment of transnationals in the Third World and contributing to their profits, the Green Revolution is responsible for massive outflow of foreign currency to purchase the needed inputs abroad. This has a negative effect on India's balance of payments position as well as curtailing capital available for the establishment of local industry and development programs (1977:56).

Simultaneously, there has been a great transformation of agrarian social and economic relations by integrating the once isolated areas or farmers into the world capitalist market system. This has been facilitated by the dependency of the new technology of manufactured inputs. The peasants who adopt new seeds must buy the necessary complementary inputs from the market. To buy these new inputs a peasant must sell his product for cash. Thus the peasant products are incorporated into the national and international market which resulted in the international division of labor (Cleaver 1974:179).

Ecological Contradictions:

Most devastating of all contradictions of the "Green Revolution" are those involving the eco-system. The extension of capitalist agriculture in the tropics brought ecological disaster (which also happened in North America). Pesticides, designed to kill a broad spectrum of pests, became more catastrophic in the tropical environment. The rice field sprays poisoned the fish ponds and subsequently deprived whole communities of their protein supply. Runoffs from the heavy fertilizer applications produce or will produce massive eutrophication of lakes and streams which is similarly disastrous to protein sources. The wholesale distribution of a limited number of vulnerable plant varieties promises to create an inviting and highly vulnerable target for pests

and disease. In order to reduce the labor costs in detasseling corn plants, the commercial breeders (in the United States) had introduced a particular kind of sterility gene. This has solved the problem of detasseling, but it has also made the corn plants highly susceptible to blight. Many areas of the Gulf states lost over 50 percent of their crop. The same kinds of problems impeded wheat production in Turkey in 1968 and 1969 and in the Philippines in 1971. The rich countries can perhaps afford such mistakes and repair the damage, but it produces disastrous results (such as famine) in the poor countries who have no resources to repair such damage (Cleaver 1974:190).

Chapter V

The Radical Strategy in China and Vietnam

1. Introduction

Taking India's "Green Revolution" as an example, we have already considered the styles[1] of rural development under the capitalist mode of production. Now a study of radical strategy (rural development under the socialist mode of production) should be highly instructive in determining the social, political, and economic consequences of a particular technological change. What will the implications be of the "Green Revolution" for a socialist framework? This question leads us to reconsider the whole "package" concept of the "Green Revolution" and make distinctions with the basic notions of the socialist mode of production.

The whole "package" of the "Green Revolution" is that it consists of HYV seeds (rice and wheat), chemical fertilizers, pesticides, herbicides, assured water (either through pumpsets, tubewells, or canal irrigation), farm machinery (such as tractors, harvesters, combines, etc.) for mechanization, private capital investment, and continuous research. In sum, the whole "package" concept must be understood in terms of capitalist agriculture as we find today in the developed countries. Therefore, the "Green Revolution" as a package has been introduced in the Third World from the developed countries.

---

[1] Three styles mentioned by Griffin (1974) and I have reduced them into two in terms of mode of production (capitalist mode and socialist mode).

In this context, the basic characteristics of a socialist mode[1] must be specified at least in general ways. These are as follows: (1) There is no private ownership of means of production (such as land, factories, mills, etc.). All the major means of production are collectively owned. (2) There is no class distinctions (such as bourgeois and proletariat in capitalist society) and the state power remains in the hands of the workers and peasants (Dictatorship of the Proletariat). (3) Collectivization of agriculture under which agricultural development takes place rapidly. (4) There is neither colonial nor capitalist domination both nationally and internationally. Finally, (5) there is realignment and redistribution of political, social, and economic power.

From the above analysis, therefore, we must not equate the "Green Revolution" "package" with that of rural development within the socialist framework. In the following, we shall demonstrate from the Chinese and North Vietnamese experiences that rural development under the socialist mode of production is more efficient in terms of production and distribution compared to other Asian non-socialist countries where the "Green Revolution" package has been introduced. Thus, in China and North Vietnam, one should not understand it as the "Green

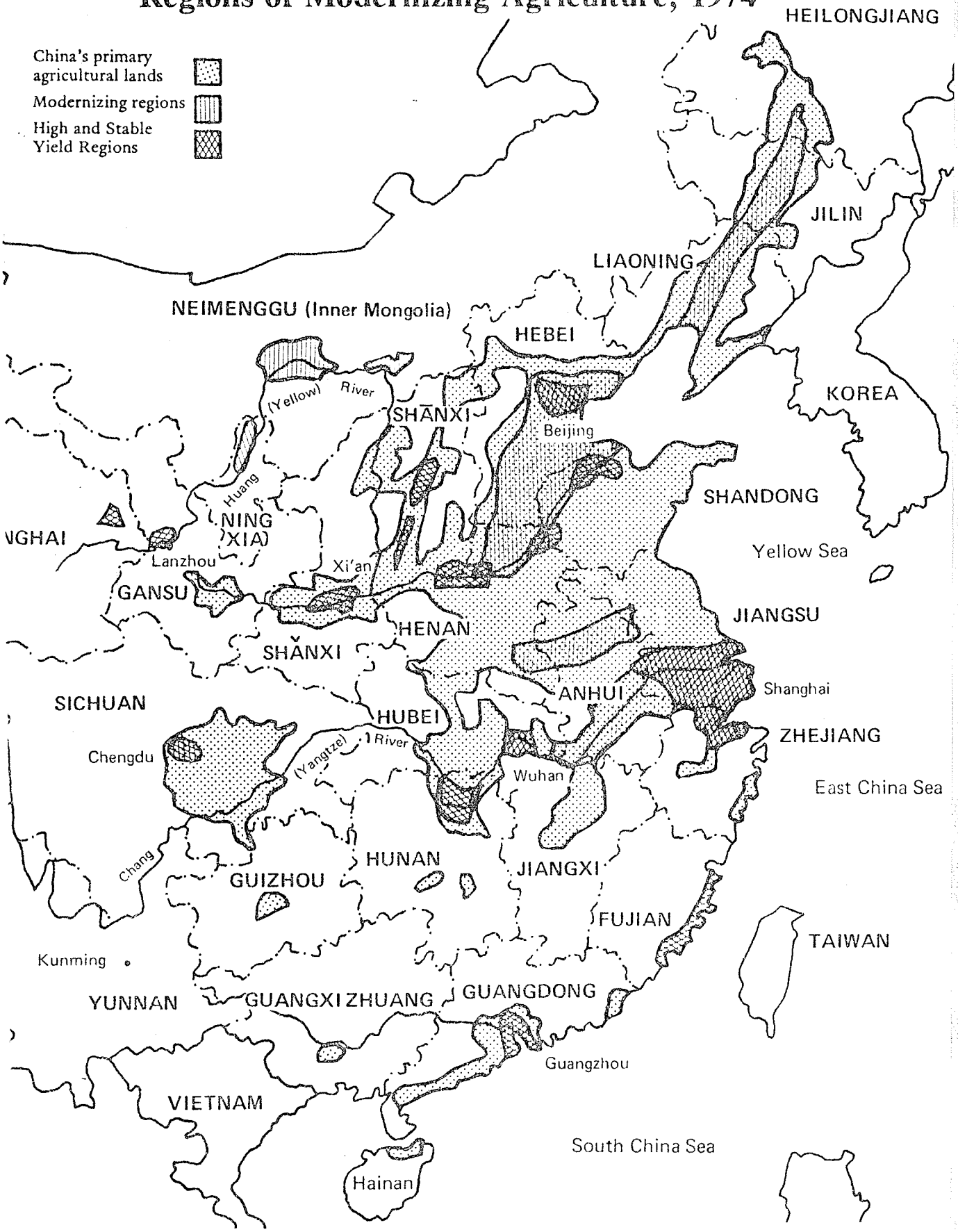
---

[1] It is beyond our scope to discuss the socialist mode of production in detail.

Revolution"; rather, it should be conceived as rural development under a socialist mode of production.

Map 2

Regions of Modernizing Agriculture, 1974



(Stavis 1975:25)

2. The Green Revolution in China

To what extent has China been successful in making a "Green Revolution" green since the 1960's? Has China been able to avoid the problems that seem endemic to the "Green Revolution" in the context of capitalist agriculture? It is not very difficult to assess and answer these questions in spite of very little data available from different sources.

It is beyond doubt that China is now a land free of widespread starvation, malnutrition, hunger and famine compared to other Asian countries (non-socialist). Whoever visits China, whether visitors, journalists, medical specialists, agricultural experts, or social scientists have been surprised to see the general standard of health and nutrition of the Chinese people[1]. Every adult Chinese is assurred of 2,050 calories of food a day. What are the causes that led the Chinese to become so successful? Do they have superior technology? Enough resources or environment? Or something else? Let us take a brief look at China's food production, growth rate, and

---

[1] One month-old infants now average 3.24 kg., compared with less than 3.0 kg. before 1949. In Wuhan, surveys showed that 10 year old children averaged 5 cm. taller in 1973 than in 1965; boys averaged 2.5 kg. heavier. In one locality populated by national minorities, seven year olds averaged 3 to 5 kg. heavier and 10 cm. taller than before 1949 (Stavis 1975:36).

other factors in comparison to other Asian countries and seek the causes of their apparent success in solving fundamental subsistence problems.

Stavis (1974a, 1974b, 1975, 1976); Bhattacharya (1974), Oxfam (1977); Blobaum (1975); Chen (1976); Nolan (1976); Padoul (1975); Liden (1975); Weisskopf (1975); Wong (1973) all suggest that there have been extensive technological changes in Chinese agriculture since the early 1960's. Stavis (1974a) estimates that by 1970, China planted about 25 million hectares (one fifth of the cultivated acreages) in High Yielding Varieties. Out of this total, ten million hectares have been worked with mechanized irrigation, chemical fertilizers, and some tractors, and another 15 million hectares were "more or less" mechanized (1974a:1). By 1965, 6.6 million hectares of land were irrigated by mechanical power. By 1974, 1.3 million mechanical pumps had been developed for 7.3 million hectares of land and 30 million horsepower of mechanical irrigation have been expanded. Furthermore, Stavis (1975) estimates that, by 1974, there were roughly 29 million hectares of cultivable land and 42 million hectares of sown land were under HYV cultivation (please see table 5) (Stavis 1975:26).

From 1956 to 1971, grain production in China grew from 190 million tons to 250 million tons (Stavis 1974a:7) and from 1952 to 1974, production rose from 166 million tons to about 257 million tons (an annual compound growth rate of 2%)(Stavis 1975).

Table 5

Summary of the Spread of Modern Grain Production in China 1974

		Area Sown to Grain Million HA[a]	Total Cultivated Area Million HA[b]
1. Modernizing Regions:			
A. High and Stable Yield Areas	11		
B. Improved Regions	32	43 (31%)	29 (24%)
2. Traditional Regions:			
Some Marginal Change		94 (69%)	91 (76%)
Total		137 (100%)	120 (100%)

(Reproduced from Stavis 1975:24)

Table 6

Food Staple Production Per Capita, 1972-73

	Production of Food Staple Equivalent (Million tons)	Population (Million)	Food Staple Production Per Capita (kg)	Index
Thailand	12.4	39.3	315	144
China	198.0	807.0	245	112
		900.0	219	100
Taiwan Province	3.5	15.0	231	105
Nepal	2.6	11.9	220	100
Burma	6.0	29.4	203	93
South Korea	6.6	34.1	194	88
India	99.0	569.2	174	79
Pakistan	10.7	67.3	158	72
Bangladesh	12.5	81.8	151	68
Indonesia	19.2	131.6	146	67
Philippines	5.7	41.5	137	63
Malaysia (West)	1.2	9.8	122	56
Japan	13.0	107.7	121	55
Sri Lanka	1.0	13.4	74	34

Source: The figures represent the sum of averages of estimates of individual crops for 1972 and 1973 by FAO (in Production Yearbook 1973) and USDA (Agricultural Statistics, 1974). The only exception is Taiwan Province, for which data comes from Population Yearbook 1971.

The population of China is very much a question mark in this type of analysis. Computations here use alternative population estimates and base the index on the high population estimates - an estimate Stavis considers to be unrealistically high.

(From Stavis 1975:30)

Compared with other Asian countries, China's agricultural development has been very successful. FAO estimates the annual growth rate of food production from 1952 to 1972 was 2.3 percent in China. Total agricultural production went up 24 percent from the early 1960's to 1972. Though the growth rate of China's food production is a little lower than the other Asian countries (please see table 6), China seems to be expanding food production more rapidly than the others (Stavis 1975).

The main causes of Chinese success, Stavis thinks, are three: first, the state fully supports the expansion of agricultural production; second, the bulk of the benefits of modern agriculture remain in the rural sector; third, the benefits are shared by everyone in the rural sector (Stavis 1975:32). But more than these, according to our assumption, is the collective ownership of means of production, being freed from all ills of capitalism, destruction of landlord classes in the countryside, and depending on "self-reliance" strategy (radical strategy) of rural development.

However, it is necessary to analyze the success of China's rural development. It also has possible relevance to other underdeveloped countries of the world. The whole mechanism of China's success lies with the Maoist strategy of economic development. As summarized by Gurley (1976:104-105), these

are as follows:

1. Destroy the feudal landlord-bureaucrat class structure, and redistribute land and power to the peasants and workers.

2. Establish socialist relations of production as soon as possible and use the party to educate peasants and workers in socialist values and ideas.

3. Establish full planning mechanisms to take the place of market price-determined allocation of resources and distribution of incomes, and go all out for industrialization, but emphasize those industries having direct links to agriculture.

4. Encourage rural areas in particular to produce whatever can be produced by small scale indigenous methods.

5. Develop and release human energy and creativity by promoting socialist values ("serve the people", selfishness, collective incentives) over bourgeois values (individualism, selfishness, materialism) by providing health care facilities everywhere.

6. Carry out a continuing revolution at all levels of society and maintain the dictatorship of the proletariat.

Thus, according to Maoist strategy, the problem of underdevelopment has to be tackled as a whole, not piecemeal.

We should keep in mind that China's agricultural development (the so-called "Green Revolution" in the Third World)

has taken place quite independently (without help from the West) and on the basis of Maoist development strategy (socialist mode of production) with emphasizes self-reliance and hard work through cooperation. China has modernized her backward agriculture in much the same says as we find everywhere. These are as follows:

1. electrification
2. chemicalization
3. irrigation
4. mechanization.

In addition, there is the "Eight Character Charter":

1. land construction and rearrangement
2. water control and irrigation
3. fertilizer
4. improved varieties of seeds
5. pest control
6. improved field management
7. better farm tools
8. suitable spacing of plants (Stavis 1975:26)

It should be mentioned here that China has developed her own fertilizer factories which supply roughly 4 million tons of crop nutrients annually. Another 1 million tons is imported from abroad. China also uses natural fertilizer extensively. However, China is currently purchasing large amounts of fertilizer on the international market and has recently purchased eight huge ammonia factories from the United

States and Japan. Furthermore, China has developed her own high yield variety rice and wheat seeds in the Chinese Academy of Sciences, the Academy of Agricultural Sciences, and in various provincial level research institutions. These high yield varieties are not simple copies of varieties of IRRI rice and Mexican wheat, but in 1974-75, China imported 16 tons of Mexican high yield variety seeds. However, information is not available as to whether China has imported farm machinery from the West, although we find some news of Chinese imports of fertilizer and HYV seeds from the international market.

It is very clear, however, that the Chinese style of rural development is quite different from that of other Asian non-socialist countries.

3. The Green Revolution in North Vietnam

Gough's (1978a)[1] findings in South India and North Vietnam provides us with an excellent example of how a capitalist and a socialist mode differ in their styles of rural development. Since 1965, the "Green Revolution" was introduced into Thanjavur District of Southeast India and into Thi Binh Province of North Vietnam. She found a contrasting result in both of the cases. The following passage reveals this contrast:

> Although Thai Binh's population is 1,095 per square kilometer, compared with Thanjavur's 395, its villagers are noticeably more cheerful and prosperous, and the average and minimum standard of living of the peasants are much higher. In Vu Thang, for example, the adult minimum rice ration was 25 kilograms per month in late 1976, whereas it was 32 kilograms per household in Thanjavur, or about 8 kilograms per adult. (It was 13 per adult minimum in the cities of Vietnam, with extra ration for heavy workers.) Vu Thang's peasants eat meat or fish, eggs, and fresh vegetables daily; whereas these are rare luxuries for at least three quarters of Thanjavur's people.

---

[1] Kathleen Gough made a comparative analysis of the "Green Revolution" between India and North Vietnam. She is one of the few anthropologists who is concerned about this debate. She carried out field work in Thanjavur district of Southeast India in 1951-53 and 1976. The observation in Vietnam was made during a ten day visit to Hanoi and the surrounding provinces. It is the only source (in anthropological perspective) about the "Green Revolution" on North Vietnam, that I have been able, so far, to track down. Thus, I will more or less review her article for this purpose.

> The clothing, furniture, and houses of Vu Thang's peasants are serviceable and in good repair, comparable to those of a small landlord or rich peasant in Thanjavur, whereas Thanjavur's poor peasants and landless laborers have tiny, virtually unfurnished shacks, and sparse and ragged clothing. Elementary and high school education, hospital and medical care, day nurseries, and film shows are free and locally available to all in Vu Thang. Except for elementary schools, which the poorest children do not attend because they lack books and clothing, Thanjavur's villagers must pay for these facilities, and most cannot afford them. Harder to describe is the contrast I experienced between the daily hardship and anxiety, the mutual competition and the envy of villagers in Thanjavur, and the optimism and pride in cooperation of peasants of Vu Thang. In spite of the sacrifices and human losses of the recent war, the young people of this village appeared radiant and the older ones quietly confident in their solidarity and their achievements (1978a:16-17).

Why is there so much contrast between these two social systems? Gough found the roots of this contrast within the mode of production (though she did not mention it). Thanjavur's peasants and laborers produce for private profit and for someone else, whereas Vu Thang's people produce for their own and for the national welfare. This means their production is for their own use and not for profit or exchange. Gough found three main mechanisms in which this difference has been manifested.

First, planning and cooperation in Thi Binh made effective utilization of manpower and natural resources whereas these are wasted in Thanjavur. This implies that the collectivised agriculture allows proper utilization of human and nature resources, while both of these are wasted under capitalist agriculture

(keeping the vast unemployed reserve army hungry). In Thi Binh, since 1961, all irrigation and drainage channels have been re-dug through the cooperative to achieve optimum use of water and soil, whereas it is impossible in Thanjavur because of private holdings of lands. Thi Binh's peasants use 70% organic fertilizer (animal and human refuse, decayed trees, etc.) as opposed to 30% of chemical fertilizer. On the other hand, in Thanjavur, the costly chemical products have almost replaced organic fertilizers and in some cases have damaged crops, fish, and animals. Differences also exist in respect to manufacturing and use of agricultural machinery (such as rice mills, tractors, threshing machines and produce trucks). Most of these are locally made, are cheaper and more plentiful in Thi Binh than Thanjavur. Sixty percent of Thanjavur's labor force (11% women) remain unemployed for at least six months of the year. By contrast in Thi Binh, all able-bodied adults work 40 hours a week in the cooperatives. They are also allowed privately to raise pigs, poultry, cultivate vegetables for their own use. Besides these, the peasants work in handicraft shops (making mattresses, towels, carpets, ceramics, ropes, mosquito nets, furniture, clothes, etc.). On the other hand, handicrafts and cottage industry declined sharply in the face of industrial competition in Thanjavur.

Secondly, Thi Binh's peasants are not subject to the exploitation of many parasite classes (landlords, rich farmers, moneylenders, etc.) or foreign companies. They do not experience any heavy drain of wealth to the government, cities, or foreign countries. By contrast, Thanjavur's peasants are vulnerable to absentee landlords, moneylenders, merchants, rich farmers and transnational corporations.

Thirdly, she found extreme differences of incomes of people between these two villages of India and North Vietnam. "The incomes in Thi Binh's cooperative are markedly egalitarian compared with those in a Thanjavur village" (1978a:19). In Vu Thang, 20 percent of the regular annual wages differ between less skilled and more skilled peasants. In one Hanoi textile factory, she found a difference of only six times between the top and the bottom. In two Vietnam villages, the rich landowners' incomes are 10 to 15 times those of the poorest landowners. But in Thanjavur, the landlords and merchants enjoy 1,000 to 8,000 times the average income of a landless laborer.

Finally, Gough concludes that the standard of living of Thi Binh's rural people is much higher than in the villages of Thanjavur in spite of 34 years of intermittant warfare and 10 years of extraordinary devastation made by the United States bombers in Vietnam. The main reason behind this success is not a miracle package like the "Green Revolution" but the fact that the distribution of wealth is much more egalitarian and

the peasant-produced surpluses do not go out to absentee landlords, moneylenders or foreign companies. By contrast, in the Indian situation, peasant surpluses are extracted by a class who do not participate in the direct production and who lives wholly on what they can extract.

However, from Gough's (1978a, 1978b) articles, we do not get any idea as to whether North Vietnam has received the "Green Revolution" "package" from the developed countries. I assume that it is not the same "Green Revolution" as in India that has occurred in North Vietnam. Since we do not have any information on Vietnam's participation in the "Green Revolution" strategy (propounded by the West) as in other Asian countries (such as India or Pakistan), it is difficult to call it a "Green Revolution". Rather we can term it as a Vietnamese (socialist) style of rural development.

Chapter VI

Conclusions

In this concluding chapter, we shall continue to argue that it is the mode of production (the combination of forces and relations of production) that determine the social organization rather than technology, environment or economy as maintained by some of the anthropologists. On the basis of this proposition, we have already demonstrated that the "Green Revolution" is a capitalist mode of production and is a product of capitalism. According to the laws of the capitalist mode, the "Green Revolution", when introduced into Third World countries, has produced capitalist relations in those areas where it has taken hold. In more concrete situations, the symptoms of capitalist relations appear very clearly from our analysis of India's experience with the "Green Revolution" in particular (and its historical development in general). Thus, the "Green Revolution" can be specified as a capitalist mode of production, a development strategy or an aspect of particular theory of development of underdevelopment.

To repeat, to the adherent of the "Green Revolution", it is an appropriate way to develop the Third World agriculture. It seems to offer a "miracle" solution to the food problems of the poor countries by increasing productivity in agriculture with the help of expensive technology, apparently (to some) without changing the existing social relations. This productivity,

according to Green Revolution adherents will lead to social stability, lessen tensions in the rural areas and prevent the "Green Revolution" from turning towards "reds". But what do we find in fact? Were the new technology receiving countries of the Third World able to solve their food problems? So far as our knowledge goes, the present underdeveloped countries who accepted the "Green Revolution" were far better off in food before than they are in their present situation (for example, Pakistan, Burma, Thailand).

However, by now the hidden motives of the proponents and merchants of the "Green Revolution" are very clear. To summarize: (1) The "Green Revolution" is a product of capitalism (invented and expanded by the Rockfeller Foundation and Ford Foundation and the United States Aid agencies). (2) They have created and nurtured an international team of experts to spread this "new technology" throughout the Third World. (3) The main objectives of this strategy is "to maintain social stability", to integrate the rural areas with the national and international capitalist market system (banks, insurance companies, cooperatives, export and import companies, etc.) and to create new market and investment opportunities for the multinational corporations. (4) It has created regional desparity within nations and between ethnic groups (example: break up of Pakistan, India's Punjab, and other areas of India). (5) It has also changed the cropping patterns and methods of production. The High Yielding Varieties replaced the Local Indigeneous Varieties, machinery replaced

traditional agricultural implements contributing to the destruction of rural handicrafts industries and the loss of employment of village artisans. (6) It has accelerated the development of market-oriented capitalist agriculture. (7) It has hastened the demise of subsistence-oriented, peasant farming. (8) It has encouraged the growth of wage labor and subsequently created a class of agricultural laborers. (9) Due to mechanization and concentration of lands in a few hands, large numbers of landless laborers, small holders, sharecroppers, artisans have been thrown out of jobs. This has created unemployment in the countryside and in turn resulted in increased migration to the crowded cities. (10) Those who benefitted are larger and wealthier commercial farmers, large landowners, merchants of cities, foodgrain dealers, and the international agri-business companies. (11) Although we do not have empirical support (which requires field work), we assume that the "Green Revolution" has intensified poverty, crime, beggary and other vices in the rural areas. (12) The new chemical inputs have endangered the whole food-producing ecosystem. (13) Finally, this new strategy is helping to perpetuate and deepen the penetration of the capitalist system in the Third World.

From the above discussion, we can safely conclude that the "Green Revolution" as a technology has favored only the dominant social classes both nationally and internationally, and as a development strategy (if we consider development or welfare for everybody), it has totally failed. However, the question is

not what the "Green Revolution" has done or whether it has failed or succeeded. Here, the crucial thing is to understand the real nature of the capitalist system which destroys whenever it articulates with other pre-capitalist modes of production. In this context, Baran's remark is worth noting. He said, "a German writer once remarked, whether there will be meat in the kitchen is never decided in the kitchen. Nor is the fate of agriculture under capitalism ever decided in agriculture (Baran 1957:170)".

What is to be done if the capitalist system is for the few only and brings misery whenever and whomever else it embraces? This question drives us to search for an alternative model for rural development. We have already demonstrated from the Chinese and North Vietnamese experience that they have on the whole eliminated hunger by adopting a radical strategy in agriculture. They have broken down the power of the landlords, given emphasis to local resources, collectivized agriculture, abolished all private ownership of means of production, and freed themselves from the international division of labor. Therefore, the peasants are free from the exploitation for private enjoyment of landlords, merchants, and the foreign companies. However, we do not suggest that the radical strategy provides "miracle" solutions; we find this hope in the "Green Revolution". We simply recognize that the radical strategy can reduce the food problem more efficiently and for the whole society in contrast to the capitalist system of production

which enriches and raises the standard of living of only a few, and clearly increases the poverty of millions. Thus the only alternative open to the poor countries seems to be to terminate all colonial ties and to eliminate capitalist domination both domestically and internationally. Finally, it is necessary for them to redistribute political, social, and economic power, and to introduce public ownership of the major means of production. Some of the political leaders have been talking about this for some time. Julius Nyerere, for example, says:

> I believe that the purpose of socialism was to remove the sin of capitalism, and to return wealth to its original use -- the satisfaction of simple human needs, the banishment of poverty... this is happening in the socialist countries.... I believe that no under-developed country can afford to be anything but "socialist" (Worsley 1967: 244).

Appendices

A. Glossary

B. Acronyms

C. A Note on Indian Anthropology

Appendix A

Glossary

Abstract and Concrete

The abstract is the starting point of theoretical practices in any scientific investigation, while the concrete is the end point of theory. The common theoretical view regards theory as abstract and reality as concrete. Thus, abstract is theory or speculative while the concrete is real and non-speculative. Both abstract and concrete exist in thought. "The concrete-in-thought is produced wholly in thought, whereas the real-concrete survive independently outside thought -- before and after (Allhusser 1970:311)".

Articulation of Mode of Production

In the last two or three years the notion of articulation of modes of production became popular in Marxist development theory. This notion came up when Marxist scholars were having problems of analyzing the paradox of capitalism's relation to other modes of production (qv. "mode of production").

Meillassoux (1972) describes pre-capitalist forms as undermined by capitalism. Thus, Rey (1971), Terray (1972), and Meillassoux are concerned with articulation of capitalist mode with other pre-capitalist modes in which the former destroy or undermind the latter.

Deductive

A logical inference or chain of reasoning that proceeds from known general principles or theories and traces out what their consequences would be. In this thesis, a deductive method has been followed.

Dependency Theory

A theory developed by some Latin American scholars (especially A.G. Frank) in which they maintain that Latin America has been incorporated into the world capitalist market system in the colonial period. Since then, these countries became dependent on the developed capitalist countries of the West. Therefore, the present backwardness of these societies is precisely the outcome of the dependent character of this incorporation.

Development

"Development" is a concept and a term used in a wide variety of academic disciplines (for instance, in biology, development of cells, evolution of species, etc.; in sociology and anthropology: change, evolution, progress, development, etc.; and in economics: economic development). For the purpose of the present thesis, it refers to "a set of independent processes through which a 'traditional' social structure is transformed into a 'modern' social structure" (Rhodes 1970:xi). Furthermore, development must

not be recognized as simply economic development, rather it should be understood as the total development of society. More precisely, instead of looking at Gross National Product in per-capita index, one must direct attention to the "achievement of better nourishment, better health, better education, better living conditions and the better conditions of employment for the low and proverty groups in the poor countries of the world" (Meir 1976:11).

HYV Rice (Philippines' Dwarf Rice)

In 1962, Ford and Rockfeller Foundations established the IRRI in the Philippines. At this Center, a genetic cross was achieved between a variety of rice from Indonesia and one from Taiwan. It is now called IR-8, which is capable of doubling the yields of most Asian rices.

HYV Wheat (Mexican Dwarf Wheat)

New high-yielding strains with short, strong stems were develped in Mexico with Rockfeller Foundation support. However, there is no accepted definition of the HYVs. In this thesis, the term has been used only to refer to those grains developed at CIMMYT in Mexico. The planted HYV seeds, when grown up, develop short, stiff stems which permit heavy fertilization and grain weight without breaking. Controlled and careful irrigation is necessary for its short height and sensitivity

to the timing of watering. The HYV requires more inputs (such as chemical fertilizer, pesticides, more planning, etc.). Due to a shorter period of growing, controlled irrigation and application of more inputs, the HYVs bring considerable increases in yields per year through double and even triple cropping.

Inductive

In scientific inference that leads from observed data toward theoretical principles that could account for them.

LIV (Locally Improved Varieties)

Before the introduction of the HYVs, several countries in South and Southeast Asia had developed and used locally improved varieties (LIV) of rice seeds. These LIVs led to gradual (not dramatic like the HYVs) increases in the production of rice. The existence and use of the LIVs did not receive any publicity in the news media in contrast to the publicity of the HYVs. The LIVs are far less disease-prone and require less irrigation and less chemical fertilizer. Moreover, they are more popular with consumer tastes than the HYVs. A few examples of the LIVs (rice) are: (1) the Taichung native of Taiwan; (2) Sigadis and Syntah of Indonesia; (3) Malinja and Mahsun of Malaysai; (4) H-4 of Ceylon; and (5) CO-25 and ADT-27 of India (Bhagaban et al 1973:4).

Metropolis-Satellite

A theory propounded by A.G. Frank (1967; 1969) in which he maintains that capitalsim has created a set of hierarchies of metropolis (developed capitalist countries) and satellite (underdeveloped) by which the former expropriate and appropriate the latter. This metropolis-satellite relations is not limited to imperial or international levels. Sub-metropolis conditions are also created within the dependent countries where the interior regions are satellites.

Mode of Production

The mode of production is a theoretical construct of Marx. In the glossary of Reading Capital (Althusser & Balibar 1970: 317) it has been defined as a "complex structure, doubly articulated by the productive forces connexion and the relations of production connexion and containing three elements: the laborers, the means of production (subdivided into object of labour and instrument of labour) and the non-labourer".

Tubewell

A metal pipe drilled deep into the ground for the purpose of tapping ground water through several permeable layers of water-bearing soil. Tubewell is widely used in India, Pakistan, and Bangladesh.

Underdevelopment

The term "underdevelopment" appears automatically when we talk about development of non-Western societies in general (for instance, it includes development of natives in North America or Australia) and the Third World countries in particular. Large numbers of books have been published on the underdeveloped countries and many definitions have been advanced on "underdevelopment". But there is, so for, no pricise definition available on this term. However, bourgeois scholars,in their studies of the underdeveloped countries, have developed some fundamental criteria for measuring underdevelopment such as Gross National Product (GNP) and Per Capita Income which make cross-national comparisons possible and place arbitrarily all the nations of the world on a single scale of "development". On the basis of this scale (which is no longer regarded as an index of development), countries all over the world have been categorized as "developed" (North America, Eastern and Western Europe, Japan, Australia, and New Zealand) and "underdeveloped" (all other countries). However, the underdeveloped countries are now very politely termed by some conservative scholars as "developing", "less developed", "traditional", "poor", "non-Western", and so on. On the other hand, some radical scholars termed them as pre-capitalist social formations, peripheral formations (Samir, Amin 1974, 1976); satellite (A.G. Frank1967, 1969), "Third World" (Worsley 1967), and so on. Similarly, the present developed

countries have also been attributed as "capitalist", "Western", "central", "metropolis", "modern", "imperialist", "neo-colonialists", etc.

Appendix B

Acronyms

UN	The United Nations
MNC	Multinational Corporation
HYV	High Yielding Varieties of food grains
DC	Developed Countries (North America, Eastern and Western Europe, New Zealand, Australia and Japan)
UDC	Underdeveloped Countries (all the rest of the countries)
LIV	Locally Improved Varieties
IRRI	International Rice Research Institute in the Philippines.
FAO	Food and Agricultural Organization of the United Nations
AID	Agency for International Development of the U.S.
PL480	Public Law 480
IADP	Intensive Agricultural District Program
CIMMYT	International Center for the Improvement of Corn and Wheat in Mexico
JDRIII	John D. Rockfeller III
ADC	Agricultural Development Council of the U.S.

Appendix C

A Note on Indian Anthropology

Since "Green Revolution" is concerned with technological change, it is, however, necessary and convenient for us to investigate some of the anthropological literature relevant to technical change in Indian villages.

Before the introduction of "Green Revolution" in India, a number of noted anthropologists studied different aspects of rural life in India. The key areas of study were caste, family, kinship, economy, ecology, culture, and so on. However, some of the anthropologists were very much concerned with studying changes in social structure of Indian villages. The pioneers in this field are David Mandelbaum (1955), M.N. Srinivas (1955), Kathleen Gough (1955), Bernard S. Cohn (1955), Alan R. Beals (1955), Oscar Lewis (1955), Gital P. Steed (1955), and, finally, McKim Marriot (1955)[1]. It is interesting to observe that none of them (as can be seen in the following analysis) have dealt with specific change in agricultural technology in the villages.

David Mandelbaum (1955) studied an isolated tribal community called Kota in the Nilgiri Hills of South India. He describes the impact of urbanization, "Westernization", and "Sanskritization" on this tribe, and these have brought about great changes in

---

[1] All of these authors' works have been published in one book, Village India, McKim Marriot (ed.), The University of Chicago Press, 1955.

traditional ways of life of these people. On the other hand, M.N. Srinivas (1955) provides us with a functional analysis of Rampura, a village in Mysore in India. He mainly focuses on caste to caste relationships and status and role of the villagers. He sees some internal changes in Rampura village and these changes help to maintain the status quo in the village. But Kathleen Gough (1955) draws quite different pictures of Indian villages. She shows how the social system of Kumbapettai, a village in Tanjore District in India, is undergoing radical change. She also shows us how the village integration is declining and becoming dependent on urban or national institutions and wider economy. Gough clearly recognizes the forces that are breaking up the traditional local social structure; for instance, the independence from the Brahmines achieved by lower castes through acquisition of land or through entering business, political organizations, and agitation. These events are rapidly breaking down the traditional social structure and leading to a formation of caste to class.

Bernard S. Cohn (1955) also describes transformations of social structure in Indian villages. He sees changes from the viewpoint of a depressed class group in their struggles with the upper and landowning caste group. Anthropologist Alan Beals (1955) also sees external factors in the transformation of village social structure. Some of the factors he mentions

are growth of trade, transportation, manufacture, population growth, cash economy, and so on. Gitel P. Steed (1955) is concerned with the formation of personality within a social structure. He shows how an individual villager made adjustments to the expectations arising from the structure of his society.

Oscar Lewis (1955) came up with a different approach. He makes comparisons between a village in New Delhi and a village in Morelos, Mexico. Lewis identifies these two villages as instances of a societal type of peasant village. He also brings out contrasts between villages and between rural-urban social systems.

Finally, McKim Marriott (1955) raises the question of an Indian village with the larger society and with the civilization of which it is a small and local part. He also sees Indian villages from the historical perspective and historical interactions as a relation of a little community (village) and great community (civilization, government). For him, both little communities and greater communities need cooperation for each other's existence.

Thus, the above studies have failed to focus on changes in agricultural technology, though we find some report of use of tractors and fertilizer in Indian agriculture in the early 1950's. (See the discussion of farm mechanization in India in this thesis, pages71 to72 .)

However, there have been many studies on Indian villages after the introduction of the "Green Revolution" in India. The noted studies are done on "Green Revolution" by Kathleen Gough (1978a, 1978b), Joan Mencher (1970, 1974a) mentioned earlier. Besides those, a number of studies have been done by K.I Shwaran (1970), Newell (1970), Beals (1970), Eisenstadt (1970), Berreman (1970), Elder (1970), Gough (1970), Mencher (1970). Most of the above authors are concerned with social change in Indian villages. They are mostly confined in their studies to dealing with traditional-modern, modernization, Westernization, Sanskritization, and so on. As a matter of fact, Mencher (1970) and Gough mentioned some of the changes taking place due to the introduction of new technology in agriculture. However, none of the anthropologists (except Gough and Mencher) mentioned above, have specifically dealt with "Green Revolution" and its social and political implications in Indian villages.

References

Alam, M. Anis. 1978. "Science and Imperialism", Race and Class. 19(3):239-251.

Alavi, Hamza. 1975. "India and the Colonial Mode of Production". The Socialist Register. Ralph Milband & Saville (eds.), pp. 160-197.

Althusser, L. & E. Balibar. 1970. Reading Capital. London. Trans. by B. Brewster

Amin, Samir. 1974. Accumulation on a World Scale. New York Monthly Review Press.

1976. Unequal Development. Monthly Review Press, New York.

Asad, Talal and Harold Wolpe. 1976. "Concepts of Modes of Production". Economy and Society 5:471-506.

Banaji, Jairus. 1972. "For a Theory of Colonial Mode of Production". Economic and Political Weekly. 7(52): 2498-2502.

Baran, A. Paul. 1957. The Political Economy of Growth. Monthly Review Press. New York and London.

Bardhan, P. 1970. "Green Revolution and Agricultural Laborers". Economic and Political Weekly. 5 (29-31): 1239-1246.

Beals, Alan R. 1955. "Interplay Among Factors of Change in a Mysore Village". Village India, McKim Marriot (ed.) The University of Chicago Press, Chicago, 1955.

1970. "Namahalli, 1953-66: Urban Influence and Change in Southern Mysore". Change and Continuity in India's Villages. K. Ishwaran (ed.) Columbia University Press, New York and London.

Bernett, Milton. 1970. "Subsistence and Transition among the Ibaloi in the Philippines: A Case Study". Subsistence Agriculture and Economic Development. Clifton R. Wharton, Jr. (ed.) Chicago: Aldine Publishing Company, pp. 284-295.

Berreman, Gerald D. 1970. "Pahari Culture: Diversity and Change in the Lower Himalayas". Change and Continuity in India's Villages. K. Ishwaran (ed.) Columbia University Press, New York and London.

Bhagaban, et al. 1973. The Death of the Green Revolution. A Heslemere Group and Third World Publication, London.

Bhattacharaya, D. 1974. "India and China -- Contrast and Comparison, 1950-72". Journal of Contemporary Asia. 4(4):1774.

Billings, M.H. et al. 1969a. "Conventional Energy as a Constraint to the Green Revolution: The Punjab Case". USAID (Mimeo), New Delhi.

1969b. "Labour and the Green Revolution: The Experience in Punjab". Economic and Political Weekly 4(52):A221-A224.

1970a. "Farm Mechanization and the Green Revolution -- 1968-1984: The Punjab Case". USAID (Mimeo), New Delhi.

1970b. "Mechanization and Rural Employment with some Implication for Rural Income Distribution". Economic and Political Weekly 5 (26):A61-A72.

1970c. "Mechanization and the Wheat Revolution: Effects on Female Labour in Punjab". Economic and Political Weekly 5(52):A169-A174.

Blobaum, Roger. 1975. "Why China Doesn't Starve". Ramparts 13(9):38-42.

Bradby, Barbara. 1975. "The Destruction of Natural Economy". Economy and Society 4:127-161.

Brown, L.R. 1968. "The Agricultural Revolution in Asia". Foreign Affairs 46(4):688-698.

1970a. "Human Food Production as a Biosphere". Scientific American 223(3):160-170.

1970b. Seeds of Change: The Green Revolution and Development in the 1970's. New York: Praeger.

1974. By Bread Alone. New York: Praeger.

Byres, T.J. 1972. "The Dialectic of India's Green Revolution". South Asian Review 5(2): 99-116.

Chattopadhyay, P. 1972a. "On the Question of the Mode of Production in Indian Agriculture: A Preliminary Note". Economic and Political Weekly 7(13):A39-A46.

1972b. "Mode of Production in Indian Agriculture: Anti-Kritik". Economic and Political Weekly 7(53): A185-A192.

Chen, Kuan-I and R.T. Tsuchigane. 1976. "An Assessment of China's Foodgrain Supplies in 1980". Asian Survey 16(10):931-947.

Chopra, Kusum. 1972. "Tractor Purchase and Utilization". Economic and Political Weekly 7(53):A171-A176.

Cleaver, H.M. Jr. 1972. "The Contradictions of the Green Revolution". Monthly Review 24(2):81-128.

1974. "Will the Green Revolution Turn Red?" The Trojan Horse. Steve Weissman (ed.) Rampart Press, San Fransisco.

1976. "Internationalization of Capital and Mode of Production in Agriculture". Economic and Political Weekly 11(13):A2-A16.

Cohn, Bernard S. 1955. "The Changing Status of a Depressed Caste". Village India. McKim Marriott (ed.) Chicago: University of Chicago Press.

Dandekar, V.M. et al. 1971a. "Poverty in India I: Dimensions and Trends". Economic and Political Weekly 6(1):25-48.

1971b. "Poverty in India II: Policies and Programmes". Economic and Political Weekly 6(2): 106-146.

Dickson, David. 1975. "Technology and Social Reality". Dialectical Anthropology 1(1):25-41.

Edwards, R.C. et al (eds.) 1978. The Capitalist System: A Radical Analysis of American Society. Englewood cliffs: Prentice-Hall Inc.

Eisenstadt, S.N. 1970. "Prologue: Some Remarks on Patterns of Change in Traditional and Modern India". Change and Continuity in India's Villages. K. Ishwaran (ed.) Columbia University Press, New York and London.

Elder, Joseph W. 1970. "Rajpur: Change in the Jajmani System of an Uttar Pradesh Village". Change and Continuity in India's Villages. K. Ishwaran (ed.) Columbia University Press, New York and London.

Foster-Carter, Aidan. 1974. "Neo-Marxist Approaches to Development and Underdevelopment". Sociology and Development. Emanuel De Kadt and Gavin Williams (eds.) Tavistock Publications.

1978. "The Modes of Production Controversy". New Left Review. 107:47-77.

Frank, A.G. 1967. Capitalism and Underdevelopment in Latin America. New York: Monthly Review Press.

1969. Latin America: Underdevelopment or Revolution. New York: Monthly Review Press.

Franke, R.W. 1974. "Miracle Seeds and Shattered Dreams in Java". Readings in Anthropology 75/76. Annual Editions: The Duskin Publishing Group Inc., Sluice Dock, Guilford, Ca.

Frankel, F.R. 1971. India's Green Revolution: Economic Gains and Political Costs. Princeton University Press, New Jersey.

1969. "India's New Strategy of Agricultural Development". Journal of Asian Studies 28(4):693-710.

1970. "Agricultural Modernization and Social Change". Mainstream (New Delhi), January 3:1970:17.

1972. The Political Challenge of the Green Revolution: Shifting Patterns of Peasant Participation in India and Pakistan. Princeton University: Center of International Studies.

Friedman, Jonathan. 1974. "Marxism, Structuralism and Vulgar Materialism". Man 9(3):444-469.

George, Susan. 1976. How the Other Half Dies: The Real Reason for World Hunger. Penguin Books Ltd., Harmonsworth, England.

Godelier, Maurice. 1978. "The Concept of the Asiatic Mode of Production and Marxist Model for Social Evolution". Relations of Production: Marxist Approaches to Economic Anthropology. David Seddon (ed.) Frank Cass and Company Ltd., U.S.A.

Gough, Kathleen. 1955. "The Social Structure of a Tanjore Village". Village India. McKim Marriott (ed.) Chicago: University of Chicago Press.

1970. "Palakkara: Social and Religious Change in Central Kerala". Change and Continuity in India's Villages. K. Ishwaran (ed.) New York and London: Columbia University Press.

1978a. "The Green Revolution in South India and North Vietnam". Monthly Review 29:10-21.

1978b. "The Green Revolution in South India and North Vietnam". Bulletin of Concerned Asian Scholars 10(1): 13-23.

Griffin, Keith. 1974. The Political Economy of Agrarian Change: An Essay on the Green Revolution. Macmillan Press Ltd., London.

Gupta, S.C. 1975. "Structural Causes of the Economic Crisis". Economic and Political Weekly 10(3).

Gurley, J.G. 1976. "Maoist Development Strategy". Leading Issues in Economic Development. G.M. Meier (ed.) Oxford University Press, New York.

Harris, Marvin. 1968. The Rise of Anthropological Theory: A History of Theories of Culture. New York: Crowell.

1972. "How Green the Green Revolution". Natural History. pp. 29-30.

1973. "The Withering Green Revolution". Natural History, pp. 20-22.

1975. Culture, People and Nature. Thomas Y. Crowell Company Inc.

Hindess, B. and P.Q. Hirst. 1975. Pre-capitalist Modes of Production. Routledge & Kegan Paul, London, Henley and Boston.

Ishwaran, K. 1970. "Mallur: Internal Dynamics of Change in a Mysore Village". Change and Continuity in India's Villages. I. Ishwaran (ed.) Columbia University Press, New York and London.

Jacoby, Eric. 1972. "Effects of the Green Revolution in South and Southeast Asia". Modern Asian Studies 6(1):63-69.

Kaplan, D. and Robert A. Manner. 1972. Culture Theory. Prentice Hall, Englewood Cliffs, N.J.

Kay, Geoffrey. 1975. Development and Underdevelopment: A Marxist Analysis. London.

Ladejinsky, Wolf. 1969a. "The Green Revolution in Punjab: A Field Trip". Economic and Political Weekly 4(26):A73-A82.

1969b. "Green Revolution in Bihar -- The Kosi Area; A Field Trip". Economic and Political Weekly 4(39):A147-A162.

Lewis, J.P. 1970. "Wanted in India: A Relevant Radicalism". Economic and Political Weekly 5(29-31):1211-1236.

Lewis, Oscar. 1955. "Peasant Culture in India and Mexico: A Comparative Analysis". Village India. McKim Marriott (ed.), University of Chicago Press.

Liden, David. 1975. "Grain Production in China 1950-1970: A Case Study in Political Communication". Asian Survey 15(6):510.

Lockwood, B. et al. 1971. "Seeds of Development in a Delhi Village". Economic and Political Weekly 6(13):A11-A18.

Long, Norman. 1975. "Structural Dependency, Modes of Production and Economic Brokerage in Rural Peru". Beyond the Sociology of Development. Oxaal, Ivar et al (eds). London and Boston: Routledge & Kegan Paul.

Luxemburg, Rosa. 1951. The Accumulation of Capital. New York and London: Modern Reader Paperbacks, pp. 368-418.

Magdoff, Harry. 1976. "Change, Technology and Development", Monthly Review 27(8):1-11.

Mandelbaum, David G. 1955. "The World and the World View of the Kota". Village India. Chicago: University of Chicago Press, McKim Marriott (ed.).

Manu, R. 1968. "Planning for Failure in Agriculture". Economic and Political Weekly 3(1-2):77-86.

Marriott, McKim. 1955. "Little Communities in an Indigenous Civilization". Village India. Chigago: University of Chicago Press, McKim Marriott (ed.)

Marx, Karl. 1956. Karl Marx: Selected Writings in Sociology and Social Philosophy. T.B. Bottomore et al (eds.) McGraw-Hill Book Company, New York.

1967. Capital, Volume I. New York: International Publications.

1968. Karl Marx on Colonialism and Modernization. Shlomo Avineri (ed.) Garden City, New York, Doubleday.

McEachern, D. 1976. "The Mode of Production in India". Journal of Contemporary Asia.

Meier, G.M. 1976. Leading Issues in Economic Development. New York: Oxford University Press.

Meillassoux, Claude. 1972. "From Reproduction to Production: A Marxist Approach to Economic Anthropology". Economy and Society. 1:93-105.

Mencher, J.P. 1970. "A Tamil Village: Changing Socioeconomic Structure in Madras State". Change and Continuity in India's Villages. K. Ishwaran (ed.) New York and London: Columbia University Press.

1974a. "Conflicts and Contradictions in the Green Revolution: The Case of Tamil Nadu". Economic and Political Weekly. 9(6,7,8): 309-323.

1974b. "Problems in Analyzing Rural Class Structure". Economic and Political Weekly. 9:1495-1503.

Michie, Barry H. 1973. "Variations in Economic Behavior and the Green Revolution: An Anthropological Perspective". Economic and Political Weekly 8(26):A67-A75.

Miller, Frank C. 1975. "The Bittersweet Harvest of the Green Revolution". Reviews in Anthropology 2:421-428.

1977a. "Knowledge and Power: Anthropology, Policy Research and the Green Revolution". American Ethnology 4:190-98.

1977b. "Design for Rural Development". Reviews in Anthropology 4(6):599-608.

Morgan, J.P. 1978. "The 'Green Revolution' in Asia: False Promise of Abundance". Bulletin of Concerned Asian Scholars 10(1): 1-7.

Newell, W.H. 1970. "An Upper Ravi Village: The Process of Social Change in Himachal Pradesh". Change and Continuity in India's Villages. K. Ishwaran (ed.) New York and London: Columbia University Press.

Nolan, Peter. 1976. "Collectivization in China: Some Comparison with the U.S.S.R.". Journal of Peasant Studies 3(2):192.

O'Laughlin, Bridget. 1975. "Marxist Approaches to Anthropology". Annual Review of Anthropology 4:341-370.

Omvedt, Gail. 1975. "The Political Economy of Starvation". Race and Class 17(2): 111-130.

Oxfam. 1977. Land, People and Power: The Question of Third World Land Reform. An Oxfam Publication, Ontario, Canada.

Padoul, Gilbert. 1975. "China 1974: Problems not Model". New Left Review 89:73.

Patnaik, Utsa. 1970. "Capitalist Development in Agriculture: A Note". Economic and Political Weekly 6(39):123-130.

1971. "Capitalist Development in Agriculture: A Further Comment". Economic and Political Weekly 6(52):A190-A194.

1972. "On the Mode of Production in Indian Agriculture: A Reply". Economic and Political Weekly" 7(40):A145-A151.

Pearse, Andrew. 1974. "Green Revolution". Journal of Peasant Studies 1(3):386.

Rey, Pierre-Philippe. 1971. Colonialisme, Neo-Colonialisme, et Transition au Capitalisme: Example de la Comolog du Congo-Brazzaville. Paris: Maspero.

Rhodes, R.G. (ed.) 1970. Imperialism and Underdevelopment. New York and London: Monthly Review Press.

Rudra, Ashok. 1970. "In Search of the Capitalist Farmer". Economic and Political Weekly 5(26):A85-A87.

1971. "The Green and Greedy Revolution". South Asian Review 4(4):291-305.

Sau, R.K. 1971. "Agricultural Revolution by Production Function". Economic and Political Weekly 6(26):A50-A58.

Schultz, Theodre, W. 1964. Transforming Traditional Agriculture. New Haven: Yale University Press.

Sengupta, S. et al. 1968. "H.Y.V.P. for Rice: Performance in a Bengal District". Economic and Political Weekly 3(43): A26-A28.

Sharma, H.P. 1973. "The Green Revolution in India: Prelude to a Red One?" Imperialism and Revolution in South Asia. Kathleen Gough and Hari Prasad Sharma (eds.) New York and London: Monthly Review Press.

Srinivas, M.N. 1955. "The Social System of a Mysore Village" Village India. McKim Marriott (ed.) Chicago: University of Chicago Press.

Stavis, Benedict. 1974a. Making Green Revolution: The Politics of Agricultural Development in China. Rural Development Committee, Cornell University.

1974b. China's Green Revolution. Monthly Review Press.

1975. "How China is Solving its Food Problem". Bulletin of Concerned Asian Scholars 7(3):22-38.

1976. "China's Rural Local Institutions in Cooperative Perspective". Asian Survey 16(4):381.

Sweezy, Paul M. 1970. The Theory of Capitalist Development. New York and London: Modern Reader Paperbacks.

Steed, Gitel P. 1955. "Notes on an Approach to a Study of Personality Formation in a Hindu Village in Gujrat". Village India. McKim Marriott (ed.), Chicago: University of Chicago Press.

Terray, E. 1972. Marxism and Primitive Societies. Translated by M. Klopper. London, New York: Monthly Review Press.

Vyas, V.S. 1970. "Tenancy in a Dynamic Setting". Economic and Political Weekly 5(26):A73-A80.

Wallerstein, Immanuel. 1974. The Modern World System. New York.

Warren, Bill. 1973. "Imperialism and Capitalist Industrialization". New Left Review 81.

Weisskopf, Thomas. 1975. "China and India: A Comparative Survey of Performance in Economic Development". Economic and Political Weekly 10(5,6,7):175-194.

Wong, John. 1973. Land Reform in the People's Republic of China: Institutional Transformation in Agriculture. New York: Praeger Publishers.

Worsley, Peter. 1967. The Third World. Weidenfeld and Nicolson, London.