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Agricultural development through agrarian reform in Guyana

Ashton Isardatt Veramallay
Iowa State University

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by

Ashton Isardatt Veramallay

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I. INTRODUCTION

Guyana, formerly British Guiana, became independent on May 26, 1966 after 150 years of British rule. The attainment of political independence, however, did not solve all her problems. Today, there are still many diverse and complex problems plaguing this nation. They are mainly economic, political, and sociological in nature. This study deals primarily with the economic problems confronting the agricultural sector insofar as these problems are rooted in defects within agrarian structures.

Presently, about 35.0 percent of the economically active population, according to the United Nations classification, engage in various forms of agricultural pursuits (57, p. 22). The contribution of agriculture to Gross Domestic Product[1] (hereafter referred to as GDP) during the period 1960-69 was 25.0 percent. Population increased 3.1 percent annually during this period (53, p. 120). Consequently, on a per

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[1]The gross domestic product at market prices as defined in the United Nations Yearbook of National Accounts is the market value of the product, before deduction of provisions for the consumption of fixed capital, attributable to factor services rendered to resident producers of the given country. It is identically equal to the sum of consumption expenditure and gross domestic capital formation, private and public, and the net exports of goods and services of the country. It differs from gross national product (GNP) at market prices by the exclusion of net factor incomes received from abroad (60, p. XV).

As of December 1971, the Guyana (G) dollar is valued at 0.50 United States (U.S.) dollars. Previously, it was tied to the pound sterling.

capita basis, productivity declined during the decade. Guyana is not poor in her natural resources but in her ability to translate existing natural and human resources into increased productivity. This study attempts to demonstrate that defects in agrarian structures constitute serious obstacles to agricultural development and, hence, national economic development. To promote agricultural development, it is necessary to remedy these defects. But such remedies must be based upon analyses of the defects and how the defects may be overcome. This is the substance of this study.

A. The Problem of Structural Defects within Agriculture

The structural defects characterising agriculture in Guyana tend to impede the pace of agricultural development and, hence, national economic development. Defects in Guyanese agrarian structures such as uncertainties arising from conditions of tenure, high fixed costs to operator, lower uses of land arising from pattern of ownership, small holdings, high fixed costs of operating capital, and high fixed costs of ownership are likely to impair the efficiency of agricultural production and the distribution of factor returns. Moreover, the absence of adequate credit and marketing institutions conspires to perpetuate low productivity and low income in agriculture which, in turn, slow the process of national economic development.

B. Objectives of This Study

This study will attempt to analyse the role of agrarian reform in the agricultural development of Guyana through incentives, knowledge and capital criteria.

The specific objectives of this study are: 1) to develop conceptually a model of economic development based primarily on land tenure structures as a means of providing the necessary conditions for achieving agricultural development, which, in turn, contributes to national economic development, 2) to develop and test hypotheses involving land tenure structures in terms of their ability to promote agricultural development, and 3) to offer some alternatives for the solution of problems on the basis of the conceptual analysis.

C. Procedures Used in Pursuing These Objectives

Considering the objectives of the Development Programme 1966-72 designed for Guyana, the major goals of agricultural development are the following: 1) to increase productivity, 2) to raise per capita real income, and 3) to provide each farmer sufficient resources, facilities and other means for increasing productivity and income (4, pp. 1-27).

Within the context of these developmental goals, present land tenure structures in Guyana will be evaluated on the basis of improved resource allocation as a means towards the achievement of agricultural development goals. The criteria will entail: 1) incentives for the farmer to

increase productivity, 2) introduction of technological and managerial innovations, and 3) favourable conditions for capital formation and productive investment.

Thus, hypotheses suggested by these criteria will be developed in the later sections in order to discover the strategic operating factors within the various tenure arrangements that will contribute to the attainment of developmental objectives. On the basis provided by the means-ends continuum in Chapter III, a set of hypotheses is formulated to serve as directors of inquiry into the problematic situation. Within this conceptual framework, failure and success elements in the existing land tenure structures will be identified. Available empirical data, although insufficient and largely unavailable, will be brought to bear on analysis as much as possible. The analysis will include identification of data needs for further analysis.

D. Organisation of This Report

Chapter I presents an introduction to the problematic situation followed by statements on the general purpose, objectives, and procedures of this study.

In Chapter II the role of agriculture within the national economy is reviewed. Chapter III presents the conceptual approach to the analytical framework. An attempt is made to show the crucial importance of the

agricultural sector within the national economy. Three types of hypotheses - delimiting, diagnostic and remedial - are advanced to determine (1) the nature of land tenure structures and (2) their effects upon enhancement of agricultural development. A structural change model is also developed.

Chapter IV deals with defects in agrarian structures as problems encountered in achieving economic growth and includes the delimiting and diagnostic phases of inquiry.

Chapter V contains ameliorative measures to the problems being investigated. It constitutes the remedial phase of inquiry towards economic development of the agricultural sector within the national economy.

Chapter VI develops a macroeconomic model for financing agrarian reform in Guyana while Chapter VII deals with supplementary measures for effecting agrarian changes.

Chapter VIII specifies the need for and nature of additional studies to test further the hypotheses suggested and developed in this study.

Finally, Chapter IX presents a summary and conclusion of the study.

E. Concepts and Definitions

Throughout this study, terms such as agrarian reform, agricultural development, economic development, land tenure structures, agrarian structures, land reform, underdevelopment, and related terms are used. The meanings of these terms as

used in this thesis are presented below within the context of meanings contained in the literature on agrarian problems.

Agrarian reform is defined by Thorbecke et al. to include changes in rural institutions with the objective of improving rural standards of living. He notes:

> "These institutions include those of holding and transmitting rights in land, allocating returns to land between owners and tenants, extending credit for land purchase, farm operation and improvements, taxing land values and land income, conserving and developing agricultural and other resources, marketing of farm and other products, broadening opportunities for educating and training rural people and promoting rural health and welfare services" (46, p. 590).

In this study, agrarian reform connotes changes in the structure of agrarian institutions to improve the efficiency of agricultural production and the distribution of factor returns as means of achieving both the economic and non-economic ends of agrarian development.

Agricultural development denotes, according to Parsons, the transformation or modernisation of an antecedent traditional or subsistence agriculture (36, p. 1185). In this study it also means the availability of sufficient resources and facilities to farmers so that increased productivity and per capita real income are possible.

Economic development, Gittinger notes, is thought of as a process in which the population of a country, by conscious and active promotion, utilises its human and physical resources to bring about a sustained per capita increase in

the output of scarce goods and services, provided at the same time the distribution of these goods and services to the individuals of the nation does not become less uniform (13, p. 116).

Land tenure structures refer to the economic, legal or customary arrangements regarding the ownership and management of land. Timmons suggests:

> "The generalized role of land tenure institutions (structures) in agricultural and national development is to facilitate and not hinder the achievement of developmental goals set by and for a country" (47, p. 86).

This study assumes land tenure structures form a significant part of agrarian structures as they exist in Guyana.

Agrarian structures are concerned with the institutional framework of agricultural production. It encompasses land tenure, the distribution of ownership of farm property between large estates and peasants, forms of credit, agricultural marketing, rural taxation, and governmental services of the rural population (49, p. 5).

Land reform refers principally to redistribution of ownership rights in land. Gittinger considers land reform as a transfer of the ownership rights in specific parcels of land from individuals holding larger amounts than they themselves can farm in the existing agricultural tradition of the areas to peasants who hold by virtue of the reform no

more than the amount they themselves can cultivate. Further, land reform may also involve consolidating and rationalising scattered plots of land belonging to various owners (13, p. 236).

Underdeveloped is basically a policy term. Higgins states that a country becomes classified as underdeveloped if it so declares itself by applying for foreign aid and if the donor countries confirm its status by providing assistance. Countries which have less than $600 (U.S.) of gross national product per capita fall under this category (20, p. 9). The terms underdevelopment, underdeveloped, poor, less developed and developing are used interchangeably in this study.

Social progress is used here, as defined by Timmons, to mean:

> "...development of individuals as informed and participating members to the extent of their inherent abilities, in the economic, social and political life of a country. This involves providing the environment and opportunity for individuals to develop their potential talents with which they are endowed" (47, p. 7).

Individuals, organised in an integrated society under a stable and progressive political system, should be able to pursue a way of life which is capable of satisfying their physical, economic, intellectual and spiritual needs.

Political stability concerns orderly change towards social progress and economic growth which involves the maintenance of a minimum "stability threshold" sufficiently

dynamic to accommodate change at a magnitude and tempo necessary in realising social progress and economic growth (47, p. 7).

II. THE AGRICULTURAL SECTOR WITHIN THE NATIONAL ECONOMY

Inherent within this study are the conjoint inter-relationships between agricultural development and national economic development. Consequently, all genuine agrarian reform measures through their multiple effects on national economic development have to come to grips primarily with the reality of conditions in economic underdevelopment.

To begin with, in less developed countries land has always been of major importance in the livelihood of man and in allocating scarce resources among competing ends. For about two centuries, Guyanese people have been engaging in agriculture, which has been their principal source of livelihood. Basically, the agricultural sector provides the food and fibre necessary to sustain any labour which may be transferred to other forms of economic activity. Further, if agriculture is going to contribute effectively to national economic development, per capita productivity in this sector must increase. This is important for several reasons which may be expressed in terms of the following relationships: if output (Y_A) in the agricultural sector increases and consumption (C_A), outflow (O_A) and inflow (P_A) remain constant, this yields an increase in savings (S) which can be used for investment (I) purposes in both the agricultural and nonagricultural sectors so as to promote national economic development. If, however, output (Y_A) declines, consumption

(C_A) and outflow (O_A) increase, and inflow (P_A) remain constant, this yields a decrease in savings which cannot be used effectively to promote national economic development. These intra-sectoral relationships stated in the following manner can be changed and applied to the other sectors as well.

$$Y_A - C_A - O_A + P_A = S = I$$

$$Y_A\uparrow - C_A - O_A + P_A = S\uparrow = I\uparrow$$

$$Y_A\downarrow - C_A\uparrow - O_A\uparrow + P_A = S\downarrow = I\downarrow$$

Owen, in dealing with the 'production squeeze' on agriculture, recognises:

> "Peasants are strategically important not only because of their numbers, but also because they produce one of the most important material inputs associated with the process of capital accumulation, namely, the food and fibers necessary to sustain any labor which is diverted to any other form of economic activity. Beyond this, they also represent the prime immediate source of foreign exchange earnings in many underdeveloped countries" (35, p. 1).

Inherent in the development process of a country according to Owen's reasoning, is the progressive release of labour resources in farming to secondary and tertiary activities. This form of 'emigrant capital' to the nonagricultural sector not only enhances labour productivity in the agricultural sector but also the purchasing power of rural people. In this way an expanding market for industrial goods can emerge, thereby forging strong inter-sectoral linkages and

reciprocal advantages towards the path of developing the national economy (21, pp. 60-90). Agriculture, being the mainstay of the Guyanese economy, could help improve the balance of payments position of the country through greater opportunities of agricultural exports and less imports of both agricultural and nonagricultural commodities which could be produced locally. It is significant to note from Table 1 that the sales and purchases of the agricultural sector on an inter-industry basis contributed 20.3 percent to the GDP at current factor cost, whereas food processing and the other sectors contributed 7.3 percent and 72.4 percent respectively (24, pp. 33-34). Moreover, the contribution of the agricultural sector to GDP has been increasing steadily in the succeeding decade. Given this income and expenditure pattern and those of Tables 2a and 2b, it is reasonable to state that the agricultural sector has a crucial role to play in the process of economic development (60, p. 277). Defects in agrarian structures are reflected in the income of the agricultural sector. Similarly, improvements in agrarian structures are reflected not only in the income of the agricultural sector but also that of the nonagricultural sector, assuming simultaneous adjustments. Hence, one of the central aims of economic policy should be not only to remedy agrarian defects or promote agricultural development, but also to achieve the desired rate of growth without a balance of payments crisis and without inflation.

Table 1. Inter-industry table of the economy of British Guiana, 1959 (in hundred Guyana dollars)[a]

Sales by \ Purchases by	Agriculture (1)	Livestock (2)	Mining (3)	Food (4)	Chemicals (5)
Agriculture	50,933	4,200		587,041	
Livestock, etc.	96	25,494		54,347	
Mining			2,377		
Food processing	9,865	5,699	159	45,516	9,185
Chemicals	32,437	64	12,570	10,902	5,874
Engineering	35,094	11,283	43,031	16,487	2,853
Other Manufacturing	21,424	19,395	28,428	24,543	989
Fuel and power	27,254	10,466	4,890	16,736	549
Distribution	27,804	15,868	5,762	62,952	24,451
Transport and communications	13,032	18,847	7,715	32,166	698
Banking and insurance	9,886	1,117	147	5,583	369
Professions, etc.	580	610	10,118	19,476	161
Building and construction	32,012	234	43	1,738	18
Rent of dwellings					
Sub-total	260,417	113,337	115,240	877,487	45,147
Government	42,863	14,498	43,482	102,224	17,945
Household	452,805	205,194	136,783	163,904	9,408
Foreign countries (imports)	34,805	17,724	2,352	195,650	100,578
Sub-total	530,473	237,416	182,617	461,778	127,931
Grand total	790,890	350,753	297,857	1,339,265	173,078

[a]Source: (24, pp. 33-34).

Engineering (6)	Other Manufacturing (7)	Fuel (8)	Distribution (9)	Transport and Communications (10)
				2,336
16	66,284	4,858		182
16	2,031			
	1,467	7	63	85
32	323	2	12	2
8,970	5,870	2,774	4,996	30,341
296	21,378	198	12,095	10,514
754	3,957	7,218	7,179	29,293
148,162	70,587	25,310	9,773	1,891
40	4,049	36	16,878	10,703
-88	2,551	235	13,799	7,742
39	315	257	12,419	1,144
	848		11,793	3,760
158,237	179,660	40,895	89,007	97,993
50,551	46,222	19,305	36,351	-17,730
13,624	54,036	15,747	297,342	175,515
377,289	290,134	91,482	9,303	150
441,464	390,392	126,534	324,996	151,935
599,701	570,052	167,429	432,003	255,928

Table 1 (Continued)

Sales by \ Purchases by	Banking (11)	Professions (12)	Building and Construction (13)	Rent of Dwellings (14)
Agriculture		2,413		
Livestock, etc.	22	1,698		
Mining		13	31,187	
Food processing		13,127		
Chemicals		2,009		
Engineering	144	2,254	284,718	169
Other Manufacturing	1,793	33,005	92,339	258
Fuel and power	254	4,225	660	22
Distribution	3,370	17,429	62	653
Transport and communications	931	1,993	57,077	12
Banking and insurance	18,305	-415	3,396	8,515
Professions, etc.	1,998	3,730	220	34
Building and construction	613	11,382	57	10,870
Rent of dwellings				
Sub-total	27,430	92,953	469,716	20,533
Government	7,397	10,314	2,115	18,834
Household	65,062	138,639	233,895	32,229
Foreign countries (imports)				
Sub-total	72,459	148,953	236,010	52,063
Grand total	99,889	241,906	705,726	72,596

Sub-total (1-14)	Government (15)	Household (16)	Foreign Countries (Export) (17)	Gross Capital Formation (18)
646,923	950	101,940	14,268	28,809
152,997		142,821	50,281	4,654
35,624	1,460		248,387	12,386
85,173	11,768	632,937	666,340	-56,953
64,317	5,788	92,869	12,018	- 1,914
448,984	13,491	126,377	12,323	- 1,474
266,655	48,792	216,556	45,427	- 7,378
113,457	3,645	44,370	3,826	2,131
414,074	310		17,619	
164,177	17,703	64,069	9,979	
71,202	22,078	10,156	-3,547	
51,101	540	190,265		
73,368	41,700	72,596		590,658
		72,596		
2,588,052	168,225	1,694,956	1,076,921	568,919
394,371	3,858	49,830		
1,995,183	257,139	50,168	42,583	
1,119,467	760	153,172		
3,509,021	261,757	253,170	42,583	
6,097,073	429,982	1,948,126	1,119,504	568,919

Table 1 (Continued)

Sales by / Purchases by	Sub-total (15-19)	Grand total (1-18)
Agriculture	143,967	790,890
Livestock, etc.	197,756	350,753
Mining	262,233	297,857
Food processing	1,254,092	1,339,265
Chemicals	108,761	173,078
Engineering	150,717	599,701
Other Manufacturing	303,397	570,052
Fuel and power	53,972	167,429
Distribution	17,929	432,003
Transport and communications	91,751	255,928
Banking and insurance	28,687	99,889
Professions, etc.	190,805	241,906
Building and construction	632,358	705,726
Rent of dwellings	72,596	72,596
Sub-total	3,509,021	6,097,073
Government	53,688	448,059
Household	349,890	2,345,073
Foreign countries (imports)	153,932	1,273,399
Sub-total	557,510	4,066,531
Grand total	4,066,531	10,163,604

The pursuit of this objective requires three types of ex ante balances: 1) external e.g., to avoid the loss of revenues in international transactions; 2) internal e.g., to avoid global inflationary pressures through saving and investment, notwithstanding the economy's capacity; 3) internal for each sector e.g., to avoid sectoral inflationary pressures through the supply and demand for individual commodities. To attain the foregoing objective much depends on the institutional aspects of agricultural development policy which is the subject of the next section.

A. Institutional Aspects of Agricultural Development

Development requires change. Thus, the development of economic institutions is an integral part of the modernisation of agriculture. The transformation of subsistence-traditional agriculture is a complex process. During the early phases of this process, it is vitally important that the institutional system of a country should be comprehended as a whole. For economic policies, the chief emphasis is on the state and economy because they exert powerful influences during the development process from poverty to near affluence (36, p. 1186). With a socialist government in office the role of the state becomes increasingly important in Guyana, and in terms of institutions, the emphasis is on the legal and economic. Institutions, it is worthy to note, are "collective action in restraint, liberation, and expansion of individual action" (7, pp. 69-70). The institutional situations in

Guyana were largely fashioned by European influences, particularly British, since colonisation and colonialism were undoubtedly part of Europe's intellectual, philosophical, and scientific revival (36, pp. 1187-89). This led to an institutional dualism with a British elite exercising hegemonic influence over the Guyanese. It was not until the dawn of political independence on May 26, 1966, that the vestiges of such influence were rescinded.

During the colonial era, the establishment of enclaves of export agriculture has been achieved independent of traditional agriculture in order to develop a modern agriculture which was an integral part of a world market economy but not of the national economy. Interrelations with the national economy were limited to the hiring of cheap labour from traditional agriculture. The importation of slaves from Africa and indentured servants from India to work mainly on the sugar plantations owned by overseas corporations supported such enclaves of export agriculture. The disorganisation of labour and the absence of representative government during the colonial era permitted unlimited exploitation of land, mineral resources, and people. This led to great inequalities in resource ownership and income distribution in that those favoured by the colonial rulers received preferential treatment while the masses (East Indians and Negroes) who toiled on the land received few benefits. The low levels of skills, health and social development among the rural

population may be due to colonial exploitation since the masses were deprived of the benefits of economic citizenship.

Accordingly, institutional policy in national perspective must design systems of state (organised political community) and economy (administration of resources) as going concerns, for a society built on inequality and privilege appears inconsistent with economic development. Such a policy must also attempt to deal with the legacy of problems attendant with colonial rule. Only when the powers of the state and of the economy are reciprocally related, institutional reconstruction is possible to promote national economic development. The noted English economist, J. R. Hicks, makes a poignant observation on the role of institutions in economic analysis:

> "Another more important limitation...is without any inclusion of reference to institutional controls. I shall interpret this limitation pretty severely. For I consider the pure logical analysis of capitalism to be a task in itself, while the survey of economic institution is best carried on by other methods such as those of the economic historian (even when the institutions are contemporary institutions). It is only when both of these tasks are accomplished that economics begins to near the end of its journey" (19, p. 7).

The defects in agrarian structures, identified in Chapter IV, are a serious limitation to successful agricultural development policy and, hence, national development. These variables in the developmental process can be manipulated by

the central government so that continuous progress is made possible. The most significant problem in institutional innovations is that of increasing the range of choices of objective opportunities available to individuals. This is consistent with the basic ends of life, liberty, and opportunity postulated in our means-ends continuum. According to Timmons, "any improvement in the agrarian structure which covers the institutional framework of agricultural production is an agrarian reform". He emphasises this point which is consistent with the basic goals of society as:

> "In the first place, land tenure, the legal or customary system under which land is owned; the distribution of ownership of farm property between large estates and peasant farms or among peasant farms of various sizes; land tenancy, the system under which land is operated and its product divided between operator and owner; the organization of credit, production and marketing; the mechanism through which agriculture is financed; the burdens imposed on rural populations by governments in the form of taxation; and the services supplied by governments to rural population, such as technical advice and educational facilities, health services, water supply and communications" (49, pp. 4-5).

Through this indicator, agrarian reform measures can be evaluated in the context of overall economic development.

B. Agrarian Reform and Economic Development

Closely related to the institutional aspects of agricultural development is the unique interrelationship between

agrarian reform and economic development. Since agriculture is the principal source of wealth in Guyana, the agrarian structure becomes crucial for agricultural production. This structure is based on laws, customs and established practices, voluntarily or compulsorily accepted by the farming population. Thus, any change which affects the agrarian structure is an agrarian reform. If such a change is designed to improve per capita productivity in agriculture and to realise equal income distribution in the society, it is consistent with economic development. Barlowe emphasises the importance of agrarian reform and economic development when he asserts:

> "For the most part the relationship between agrarian reform and economic development has suffered from inadequate attention and the failure of (agrarian) reformers to accept economic development as one of their goals" (1, p. 117).

If reformers are concerned only with the attainment of distributive justice or some particular political objective, their progress may have only an incidental impact on economic development. Reform measures determined primarily by political expediency or propaganda will hardly ever have favourable permanent effects on agricultural production even though they may temporarily improve the general social conditions. Thus, in adopting agrarian reform measures to promote economic development, careful consideration should be given to their financial, administrative, and technical implications. Other-

wise, they will be very expensive not only in terms of resources and lost production, but also in terms of disappointment and discouragement (24, p. 34).

Moreover, the close relationship between agrarian reform and economic development has been widely stressed by different authors (1; 10; 13; 23; 45; 47;). Some of them regard agrarian reform as a prerequisite to economic development; others consider it as a partial consequence of it. Although no meaningful, sharp separation exists between economic development and agrarian reform, it is worthwhile to recognise a separation, albeit arbitrary, for operational purposes. The complexity of the problem demands a small area for concentration, as in our case, agricultural development through agrarian reform. On this subject Fitzgerald cautions:

> "Economic development...is at once an essential prerequisite to agrarian reform and a partial consequence of it. In this country (U.S.) we have a saying...for which nobody has a concise answer, namely: which comes first, the hen or the egg? But we do not need to have an answer to this academic question in order to improve our poultry population and to improve both the quality and quantity of our egg production. Similarly we do not need to answer the question of which comes first, economic development or agrarian reform" (10, p. 385).

Likewise, defects in agrarian structures will exert their influences on agricultural development and the attainment of noneconomic goals of society. The interrelationships of rural agrarian structures and agricultural development are such that no one agrarian reform measure can be properly evaluated with-

out considering its effects on other aspects of agrarian life. Deliberate and purposeful changes such as the introduction of tenancy legislation which improves the tenant's security, and the provision of credit and marketing facilities will tend to accelerate agricultural development, and, hence economic development.

C. Agrarian Reform and Agricultural Development

To promote agricultural development, having noted the interrelationships of agrarian reform and economic development, it is necessary to have agrarian structures as facilitating rather than restraining vehicles. Since agriculture forms the primary source of economic activity in Guyana, it is noteworthy to show how agrarian structures, particularly land tenure structures, can facilitate agricultural development. These structures involve certain societal norms and prescriptions in the ownership and transmission of land. Under circumstances of great inequality and lack of opportunities, private property, freedom of contract, and competition frequently accentuate the inequality. Thus, land tenure reforms are necessary both to increase per capita real income and redistribute real income in the agrarian sector. In order to accomplish this, they may have to depart from established practices with respect to such institutions as private property, freedom of enterprise, and competition.

A distributive land reform may have manifold advantages in the context of the Guyanese situation. It can foster greater social and economic changes by revamping the power-structure over land use and by channelling the fruits of agricultural labour to bring about greater equality and wider participation in the society. Moreover, such a massive institutional change enables people engaging in agriculture to have more purchasing power to buy goods that support local industry. It is only when per capita productivity in agriculture increases that industrial expansion continues, but during the early stages of industrialisation, displacement of people is possible. Timmons points out:

> "...changes in land tenure institutions, particularly when made abruptly, may result initially in decreased per capita productivity in agriculture and as a result, impair national development..." (47, p. 86).

A distributive land reform can also give the needed incentives to agricultural producers through improved markets and incomes, wider range of consumer goods, clear titles to land, and improved tenancy arrangements. In this way, non-progressive agriculture can no longer impede economic development because when the objectives of the agricultural sector are asserted through popular organisations, a new vitality emerges within a society. A word of caution, however, is necessary. These laudable goals for distributive purposes are hoped-for ideals, and land reform offers no panacea to

grapple with the formidable and perhaps insurmountable problems in some cases, of economic development. The successful government-sponsored land reform schemes at Black Bush Polder, Mahaica-Mahaicony-Abary, and Tapakuma are, however, indicative of a conscious policy to bring about greater social and economic reforms in the Guyanese society (14, pp. 1-17). In these schemes, settlers have a minimum of 17.5 acres of farmland and receive sufficient resources and facilities from the central government so that they can boost crop production and improve living conditions. Such a measure, it must be remembered, is only an end-in-view in our means-ends continuum.

Increases in per capita productivity and improvements in living conditions of the agricultural population will also require fundamental changes in the marketing and credit structures, in the extension of education and welfare services, and in the organisation of production. For instance, changes in the marketing and credit structures through cooperative enterprises can facilitate small scale farming needs. Small farmers, acting as one group in cooperative organisations, can have better prices for their products than they will ordinarily receive by dealing with middlemen. They can also receive credit at low interest rates during the harvest period and before the final sale of their crop. This would tend to curb usurious moneylenders and exploitative

landlords. In cooperative organisations, farmers can improve their methods of distribution through standardisation of products which may lead to specialisation and economies of scale.

Further, improvements in the area of education and welfare can help overcome illiteracy, ignorance of improved methods of production, and traditionalism. With more educational facilities and a constant stream of technical information, the rural population is likely to be open-minded to innovations. This area which involves the social development of individuals will consequently require government's assistance since it is beyond the scope of private enterprise. Included in this area is the provision of adequate health services and rural amenities.

Moreover, improvements in the organisation of production not only through cooperative practices but also through the division of large and extensive estates are necessary. In these estates wages are low and farmers cannot provide a decent standard of living for their families. If these estates, however, are broken up and distributed, farmers are likely to use the land more intensively and may realise more returns to improve their living standards.

These changes, as an integral part of agrarian reform, are likely to promote agricultural development.

III. THE ANALYTICAL FRAMEWORK

It is the task of this chapter to develop an analytical framework and formulate hypotheses on the basis of the means-ends continuum developed by John Dewey. This scheme is both useful and necessary for directing inquiry into the identification and analysis of defects in agrarian structures which block or impede agricultural and national development. Accordingly, Dewey notes:

> "...ultimate ground of every valid proposition and warranted judgement consists in some existential reconstruction ultimately effected. The ultimate end and test of all inquiry is the transformation of a problematic situation which involves confusion and conflict into a unified one" (8, p. 489).

In Guyana, defects in land tenure and agrarian structures inhibit agricultural development and constitute the problematic situation by preventing the attainment of certain norms. Though agricultural development through agrarian reform is only an end-in-view, it must be subservient to more ultimate ends such as economic development, life, liberty, and the pursuit of happiness (opportunity). Timmons, articulating on ends, stresses that they perform a two-fold function in social inquiry. They serve to establish the norm from which the problematic situation may be determined as the gap between the norm and the present situation. They also serve as criteria for evaluating particular means to determine the

Basic ends	Ends-in-view: Economic development	Ends-in-view: Agricultural development	Ends-in-view: Goals of agrarian reform
Life	Subsistence norm	Sustained per capita increase in real income	Increased efficiency of land use in agriculture
Liberty	Increased productivity and use of resources	Structural changes in agrarian structures	Increased efficiency of labour in agriculture
	Increased total production of goods and services and per capita increase	Increased per capita productivity	Increased efficiency of capital in agriculture
Opportunity	More equal per capita income distribution	More widespread per capita real income	Social progress
	Institutional and civil participation		Politcal stability
	More equal property distribution		

Figure 1. Means-ends continuum

Essential elements of agrarian reform	Specific means	Defects in agrarian structures
	Improving tenancy	Uncertainties arising from conditions of tenure
Incentives	Reducing exorbitant rents	High fixed costs to operator
	Land redistribution	Lower uses of land arising from pattern of ownership
	Consolidation	Undersized holdings
	Change in inheritance system	Noncontiguous tracts
	Cooperatives	High fixed costs of operating capital
Knowledge	Taxation	High fixed costs of ownership
	Technical schools Extension services	Lack of knowledge
	Land settlement Cottage industries Conservation	Occupational immobility
Capital	Land court Cadastral survey	Depletion of soil resources
	Birth control technology	Lack of legal machinery
		Rapid population growth

Figure 1 (Continued)

degree to which the yield consequences are in line with the ends (50, p. 13).

Within the means-ends continuum illustrated in Figure 1, ends rank in accordance with their relative importance to the attainment of basic ends. Thus, some ends simply become the means to more ultimate ends, while other ends are really ends-in-view (means) for lower ends. Therefore, within this conceptual arrangement there is an intricate web of relationships between ends-in-view which become means for achieving the basic ends stated by and for society. From the international fraternity of nations, the United Nations, to the Guyanese society the basic ends of life, liberty, and the pursuit of happiness (opportunity) enshrine their constitutions either explicitly or implicitly. These ends are beyond and superior to economic ends but are not mutually exclusive (50, p. 15). The achievement of one or two of the basic ends in the absence of one or two of the others is totally meaningless. Though agricultural development through agrarian reform forms the core of this work towards economic development, its relative position consequently becomes a means for achieving the superior goals of society. Under the perspective provided by the means-ends continuum, it is possible to place each category of agrarian structures such as high fixed costs of operating capital, lack of knowledge, occupational immobility, land tenure arrangements, etc., in it. The goals

in the agricultural and nonagricultural sectors, it is interesting to note, have competitive and complementary relationships. Therefore, in the maximisation of a single end, there has to be some trade off. Timmons sums up such a situation as "one of proportionality in the achievement of goals" (50, p. 19).

To engage in a certain degree of proportionality, it behoves a society to attach relative weights to each end. Subjective measurement and evaluation of these weights are extremely difficult due principally to a lack of perfect knowledge. Nevertheless, knowledge of the characteristics of each end and their interrelationships provide a useful guide to strike a medium or balance among ends. For instance, in the case of agrarian reform goals, namely, political stability, social progress, increased efficiency in resource use, and knowledge of the production function of agriculture may provide useful insights for assigning weights to individual ends. Gittinger notes that our logical framework should serve as a basis for solving the conflict between ends-in-view where "the extent to which each is emphasized and the criteria for balancing one end-in-view against another are the more ultimate ends-in-view" (13, p. 130).

The evaluation of the process of change caused by agrarian structures, of which land tenure structures comprise a significant part in the Guyanese context, necessitates an analytical framework allowing for the appraisal of particular means in

terms of their contribution to the developmental goal. In Figure 1, the schematic arrangement attempts to show the functional relationships among agrarian reform, agricultural development, and economic development vis-a-vis the basic ends of society. None of this type of development can violate the superior ends of society. For example, in this conceptual framework, the achievement of agricultural development through agrarian reform implies a purposeful and deliberate change in land tenure institutions to attain given ends. If agricultural development violates the superior ends, chaos inevitably results.

The theory of inquiry provides a general approach to problem solving whereas a structural change model, relevant to this study, deals specifically with defects in agrarian structures. Such a model, however, is consistent with our means-ends continuum. It has the advantage of not only showing the interrelationships between endogenous and exogenous variables but also of providing a frame of reference within which: 1) different types of agrarian means may be distinguished; 2) the mutual compatibility and consistency of the objectives of agrarian reforms may be explicitly analysed; and 3) the causal relationships between agrarian reforms, as means, and predetermined targets, such as economic growth, can be established by the model (46, p. 596).

The endogenous variables, according to Tinbergen, are divided into 1) target variables which incorporate the immediate objectives of the policy maker. Such variables reflect the policy maker's preference function. Target variables may be either fixed or flexible. For example, a projected growth rate of 7.5 percent and more employment opportunities represent fixed and flexible targets respectively. The targets for Guyana are spelled out in the Development Programme 1966-1972. 2) Irrelevant variables are the economic phenomena that are referred to as side effects caused by changes in the means of economic policy (52, pp. 20-40).

The exogenous variables are divided into instrument variables which are under the control of the policy maker and data which are not controllable. The former include interest rate, public outlay, capital investment, tax rates, rights in land and jobs, resource organisation, credit system, market system, resettlement system, and built-in stabilisers, whereas the latter include input price, level of employment and income abroad, etc.

In Figure 2, the relationships among targets, instruments, and institutions are illustrated with specific reference to Guyana. These relationships are developed throughout the study and in a later chapter special attention is given to the macroeconomic implications of and the cost of financing agrarian reform in Guyana.

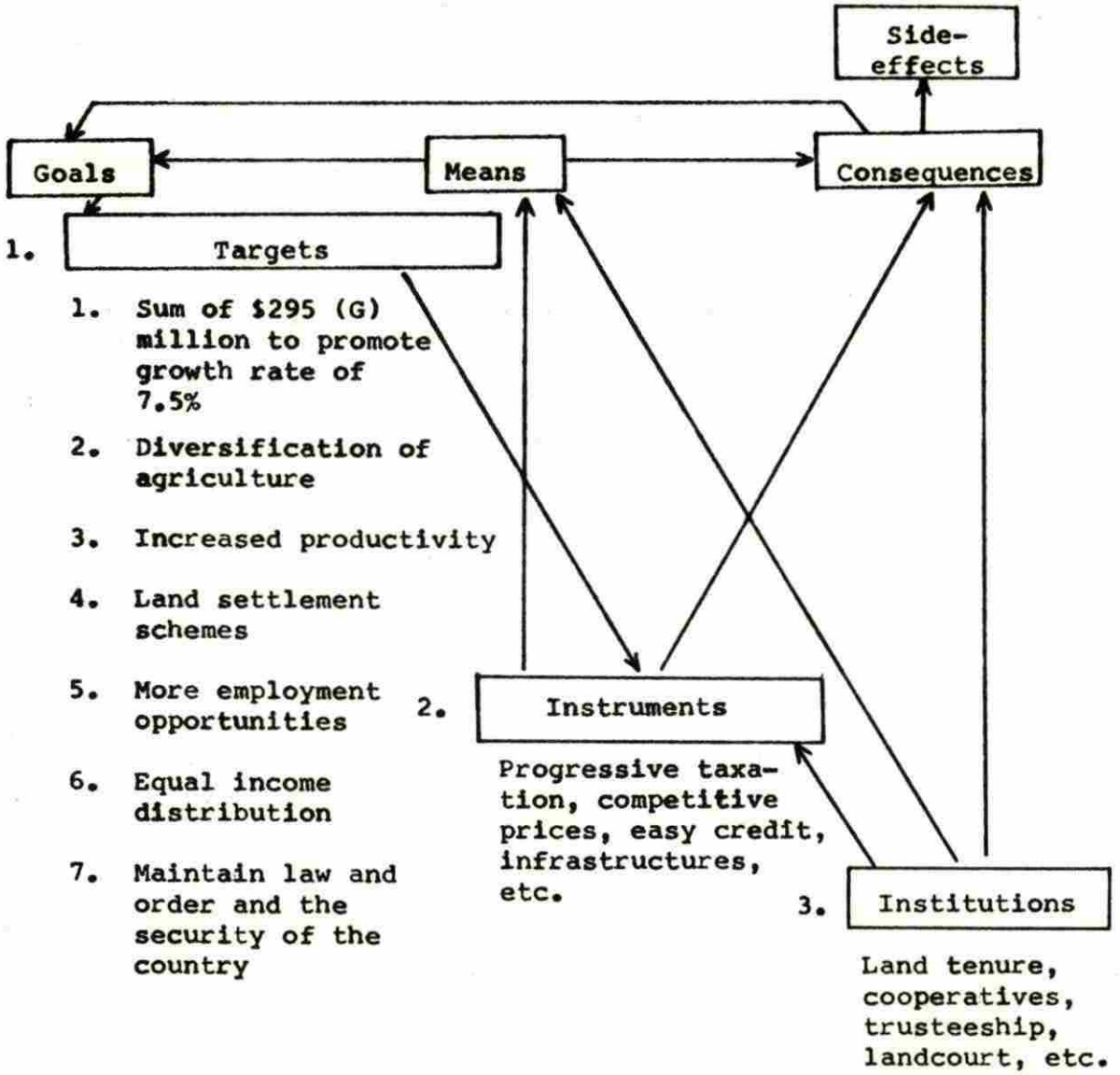

Figure 2. Relationships among targets, instruments and institutions as applied to Guyana. Modified Timmons model

A. Formulation of Hypotheses

In order for the analysis to proceed successfully, it is instructive to develop hypotheses for testing land tenure and agrarian structures in terms of their ability to promote agricultural development. The means-ends continuum depicted in Figure 1 gives the norm from which we can formulate these hypotheses on the basis of the unique interrelationships among goals, means, and consequences. The ultimate goal set for this study is economic development which entails basically two objectives: a) sustained per capita increase of goods and services, and b) more widespread per capita income distribution. Our goals set forth in Figures 1 and 2 take into account these two basic objectives since agricultural development through agrarian reform is only an end-in-view, which must not be in conflict with a higher end-in-view such as economic development in our case.

Timmons suggests three categories of hypotheses as directors of inquiry for the analysis of the role of agrarian structures in economic development. They are problem delimiting hypotheses, diagnostic hypotheses, and remedial hypotheses.

Problem delimiting hypotheses attempt to narrow the specific problem of social inquiry in terms of the gap between the end-in-view (norm) and the present situation in terms of consequences either expected or experienced. For

example, during the decade 1960-1969 GDP in Guyana at current factor cost grew at 7.1 percent while population increased at 3.1 percent. With 1964 as the base year GDP grew at 4.7 percent according to Tables 2a, 2b, and 3. Therefore, per capita real growth was 1.5 percent. The norm set for per capita real growth according to the Development Programme 1966-1972 is 2.5 percent, thus the gap is 1.0 percent.

Further, agriculture accounts for 35.0 percent of the economically active population which contributes 25.0 percent of the national product. This means that per capita income distribution in the agricultural sector was $81.25 (G) at constant 1964 dollars (see Tables 2 and 3). This low income distribution suggests that there are factors within the agricultural sector which may be restraining or facilitating vehicles for economic development.

In the area of vital statistics, the crude birth and death rates for the period 1960-1969 are 37.2 and 7.2 respectively, resulting in a natural increase rate of 3.0 percent. This means that the population will double every twenty-five years. The average life expectancy for men is 59.0 years and for women is 63.01 years. These vital statistics have far-reaching consequences for economic development insofar that agriculture is the 'backbone' of the Guyanese economy.

Table 2a. Industrial origin of GNP (in million Guyana dollars)[a]

	Current factor cost				
	1953	1955	1958	1959	1960
Agriculture, forestry hunting and fishing	53.1	51.4	58.6	55.8	69.9
Mining and quarrying	20.1	19.1	19.0	24.5	29.1
Manufacturing[b]	26.8	26.0	29.6	28.7	27.2
Construction	10.9	18.5	19.1	20.2	25.0
Electricity, gas and water					
Transport, storage and communication	10.7	11.9			19.8
			46.1	45.9	
Wholesale and retail trade	24.0	29.0			32.7
Banking, insurance and real estate					8.5
Ownership of dwellings	5.4	5.4	5.6	5.6	8.2
Public administration and defence[b,c]	16.8	20.9	25.3	27.5	25.6
Services[d]	9.1	10.5	11.3	11.6	13.1
GDP at factor cost	176.9	192.7	214.6	219.8	263.5

[a] Source: (60, p. 277).

[b] Prior to 1960, electricity is included in item 3; water and sanitary services are included in item 10.

[c] Beginning in 1960, item 5 is included in item 11.

[d] Prior to 1960, item 8 is included in item 11.

1961	1962	1963	1964	1965	1966	1967
78.0	80.5	76.2	76.1	81.5	82.2	85.3
37.3	49.9	35.8	53.5	54.0	59.3	63.7
31.5	35.6	39.8	37.0	42.7	44.3	47.7
20.8	20.8	13.8	15.1	17.1	20.6	23.0
21.8	22.1	18.2	19.9	21.3	23.7	25.8
39.2	36.6	33.7	39.1	39.4	42.1	45.7
9.1	9.0	8.7	9.0	9.8	11.2	11.2
8.4	8.5	8.7	8.3	8.4	9.0	9.5
30.5	30.5	28.1	32.3	40.2	43.4	50.0
13.2	13.7	12.3	12.7	13.9	15.1	15.6
289.8	307.7	275.4	302.9	328.3	350.9	377.5

Table 2b. Composition and growth of GDP by sectors of economic activity, 1962-66 (at current prices)[a]

Main Sector	Percentage share					Annual growth		
	1962	1963	1964	1965	1966[b]	1964	1965	1966
Agriculture[b]	22.1	24.0	21.3	20.8	19.0	-2.3	6.0	-0.6
Forestry and fishing	4.0	3.6	3.7	4.2	4.2	13.9	24.3	7.7
Mining and quarrying	16.2	13.0	17.6	16.4	18.0	49.4	0.9	19.4
Manufacturing[c]	11.6	14.5	12.2	13.0	11.8	-7.0	15.4	-0.2
Transport and communications	7.2	6.6	6.5	6.5	6.5	9.3	7.0	10.3
Construction	6.8	5.0	5.0	5.2	6.1	9.4	13.2	28.7
Commerce	12.0	12.2	13.0	12.0	12.0	16.0	0.8	9.4
Government	10.0	10.2	10.7	12.2	12.6	14.5	24.5	12.2
Other services	10.2	10.8	9.9	9.7	9.6	0.7	7.4	7.5
Gross domestic product	100.0	100.0	100.0	100.0	100.0	10.0	8.8	8.9

[a]Source: (55, p. 158).

[b]Provisional figures.

[c]Sugar cane and unhulled rice are classified under agriculture, while processed sugar and rice are included in manufacturing.

Table 3. Consumer price index[a]

Year	Unadjusted GDP	Price level index (1964=100)	Real or adjusted GDP (1964 dollars) (million Guyana dollars)
1959	219.8	92.7	237.1
1960	263.5	93.5	281.8
1961	289.8	94.4	307.0
1962	307.2	97.3	315.7
1963	275.4	99.6	276.5
1964	302.9	100.0	302.9
1965	328.3	102.7	319.7
1966	350.9	104.8	334.8
1967	377.5	108.0	349.5
1968	412.2	111.2	370.7
1969	447.0	114.3	391.1

[a]Source: (58, p. 526). Calculated.

The above setting constitutes the problematic situations delimited so as to provide a basis for social inquiry. The hypotheses will delimit the consequences of specific agrarian structures and the impact of a 2.0 percent decrease in population on GDP vis-a-vis the developmental goals within agriculture and the national economy.

Diagnostic hypotheses seek to explain why the problem exists after the specific problem has been delimited. Agrarian structures of which land tenure institutions form a substantial part have either led to a consequence short of the developmental goal or to a contribution of it. Therefore, this category of hypotheses is designed to answer questions of the following nature:

1. How and why do particular land tenure institutions affect adversely or favourably the incentives for cultivators to increase their productivity, given ample capital and knowledge?
2. How and why do particular land tenure institutions affect adversely or favourably knowledge in the form of technical and managerial innovations in agriculture, given ample capital and incentives?
3. How and why do particular land tenure institutions affect adversely or favourably the formation of capital or access to capital, given the incentives to use capital and the necessary technical and managerial knowledge?

Diagnostic hypotheses, moreover, provide the basis for developing remedial hypotheses which are of an ameliorative nature. Their function is twofold: a) removal of failure elements identified and measured in the diagnostic stage, and b) expansion of success elements detected in the diagnostic phase and development of new success elements (47, pp. 87-91; 50, pp. 24-36).

The essential elements of agrarian reform depicted in Figure 1 provide a framework from which we can identify obstacles that inhibit agricultural development. These elements are incentives for cultivators to increase their productivity, knowledge in the form of technical and managerial innovations and capital formation and access to it. For example, certain defects in Guyanese agrarian structures such as a) uncertainties arising from conditions of tenure, b) lack of secure titles to land, c) high fixed costs of operating capital, and d) occupational immobility will permit the resource owner to use resources for either short-run productive purposes or for immediate consumption purposes. As a consequence, productivity is adversely affected due to the absence of the necessary incentives.

Further, given the necessary incentives, and access to capital, improved productivity depends to a large extent on the level of technological knowledge and the adoption of technological innovations as determined by land tenure institutions. The presence of undersized holdings, non-

contiguous tracts, and lower uses of land arising from the pattern of ownership, for instance, tends to prevent agricultural operators to increase productivity. The absence of technical competency on the part of operators also tends to contribute to diminished productivity.

Nor is this all. Given the incentives and knowledge, land tenure and agrarian structures adversely affect capital use and capital formation in agriculture. In this study, it is shown that certain defects in these structures such as insecure title, high fixed costs of operating capital, high fixed costs of ownership and factor and product markets tend to reduce savings of farmers which, in turn, affect potential capital formation and capital use.

Finally, remedial hypotheses are means for ameliorating the problems previously delimited and diagnosed, by bringing about a more complete achievement of a particular end-in-view in the means-ends continuum. Primarily, they serve as a basis for suggesting alternative modifications in agrarian structures which have been evaluated on the criteria of incentives, knowledge, and capital, consistent with developmental goals. The application of the foregoing set of hypotheses to the Guyanese situation will be the purpose of the next two chapters.

IV. DELIMITING THE PROBLEMS ENCOUNTERED IN ACHIEVING ECONOMIC GROWTH

To focus on the theme of our study, agricultural development through agrarian reform in Guyana, it is important to point out the problems encountered in achieving economic growth. They encompass the problematic situations, defects in agrarian structures, and factors affecting agrarian structures.

A. Problematic Situations

The problems facing Guyana in terms of economic growth are complex and numerous. They range from defects in agrarian structures to rapid population growth. For instance, defects such as uncertainties arising from conditions of tenure, high fixed costs to operator, lower uses of land arising from pattern of ownership, small holdings, high fixed costs of operating capital, and high fixed costs of ownership tend not to permit an efficient allocation of scarce resources, thereby resulting in low agricultural productivity and low income. The problem is further complicated when factors such as lack of knowledge, occupational immobility, depletion of soil resources, and the absence of legal machinery for agrarian matters exercise their influences on the agrarian structures. A high birth rate of 37.2 and a low mortality rate of 7.2 tend to increase the dependency ratio of the economically active population.

Consequently, these problems contribute to a double developmental squeeze on agriculture to meet the needs of the nonagricultural sector through increased social overhead investments and incremental capital output ratios, and the needs of the dependent population (36, pp. 45-65). They also act as a brake during the process of achieving both the economic and noneconomic ends of economic development. The persistence of a per capita growth gap of 1.0 percent suggests a lagging performance of the economy, and that there may be forces or factors within the agricultural sector contributing to this gap. Agriculture, it must be remembered, is of paramount importance to the realisation of developmental goals because agricultural products contribute over 65.0 percent of domestic exports. From agriculture, too, 35.0 percent of the active labour force derive their means of livelihood (32, pp. 11-17).

B. Defects in Agrarian Structures

We shall now investigate the outstanding defects in agrarian structures, as they exist in Guyana, to the extent that they inhibit agricultural development and national economic growth.

1. Uncertainties arising from conditions of tenure

Tenancy arrangements involve the combination of the resources of landlord and tenant together with stipulations

in regard to the distribution of returns emanating from the tenancy contract. These arrangements can facilitate or impede agricultural development. They provide the resource-owner with a certain 'bundle of rights'. Harris, speaking about land tenure, states:

> "The bundle is made up of many heterogeneous, complex, highly flexible sticks. The complete quota of sticks covers all sorts of relations. It is a mass of claims, privleges, powers, and immunities" (15, p. 4).

If a tenant, however, operates on a short lease or does not have a secure title with respect to land and water rights, he will not manage the resources efficiently since the planning horizon will put a brake on his line of operation. The tenant will have little or no incentive to increase his output because a larger share in any such increase will go to the landlord, who has incurred a smaller share of its cost. The tenant will tend to engage in activities which will maximise returns within a short planning period.

With the aid of Figure 3 we can explain why a low security of tenancy is a serious obstacle to agricultural development and, hence, economic development. The vertical axis represents the capitalised total return expected by a tenant for some form of investment while on the horizontal axis time is plotted. At t_1 (or planning horizon) the tenant expects Or_1 returns. He will tend to grow crop(s) which will be harvested within that planning horizon due to the nature of a short-term lease

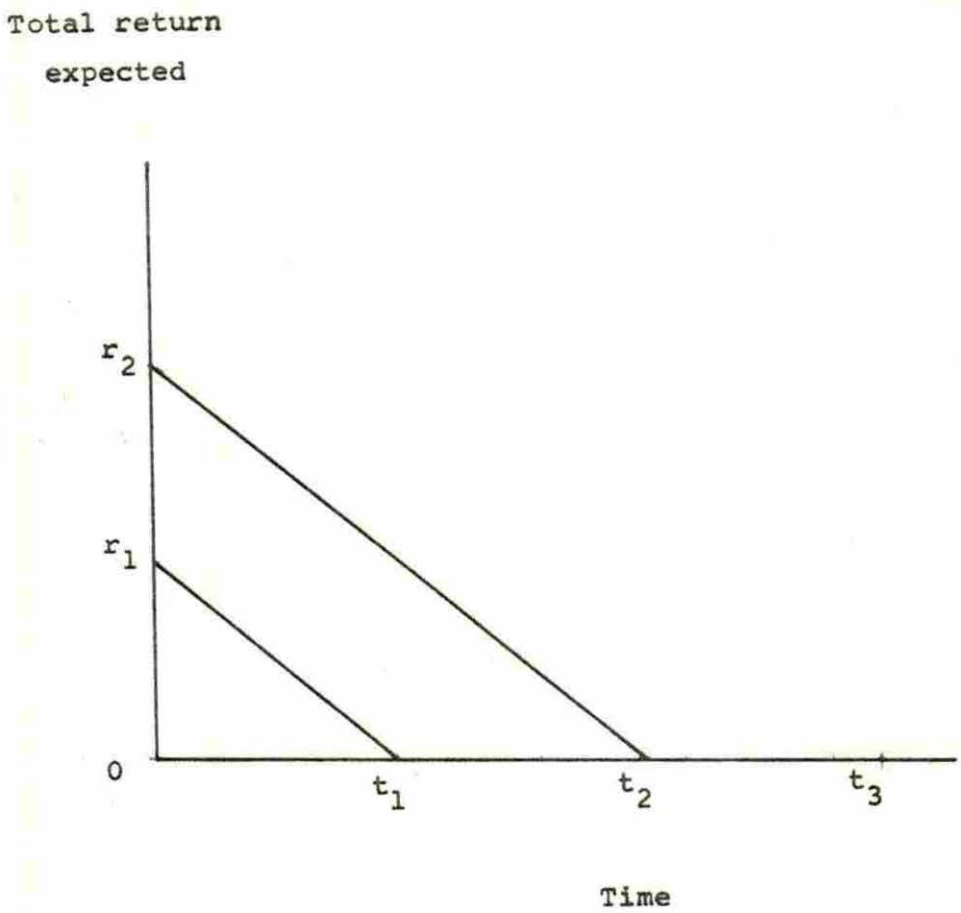

Figure 3. Expected planning horizon

which is limited in our case to a year. A feasible and lucrative planning horizon is t_2 which will involve a longer time and will yield the tenant a larger return Or_2. The tenant in this case can engage in livestock production or perennial crop enterprises. But the tenant in our example is not sure of staying on his farm for the length of time necessary to realise his investment in a longer-term undertaking and his planning horizon is necessarily limited to time t_1. So is his money income r_1. He could increase his money income to r_2 if his planning horizon could be extended to time t_2.

If the tenant is assured of secure tenancy for a longer period in the future, say, t_3, he may not be able to plan a more efficient cropping system beyond time t_2. Accordingly, t_2 becomes the norm for extending the tenant's planning horizon and the tenancy contract. Timmons points out:

> "Beyond a certain length of time the individual cultivator's plans are unaffected by assurance of secure tenancy for a longer period in the future" (49, p. 12).

In a study of the rice sector in the economy of Guyana, O'Loughlin notes that insecurity of tenure, uncertainty regarding titles, and in some cases, burdensome rents are a restrictive influence not only in rice production, but perhaps more particularly in preventing development of other crops of a longer maturing type such as coconut, coffee, and cocoa

(34, p. 138). Ramsahoye in a comprehensive study of the development of land law in Guyana also notes:

> "...the admixture of legal principles adopted by legislation to meet the needs of a small agricultural community the population of which has barely exceeded six hundred thousand over three and a half centuries. The efficiency of of the Roman-Dutch law had been impaired before its abolition. The existing system could not be effectively administered because of the absence of authority on the application of the English law of personal property to land and judicial reticence was until recently an obstacle to its development" (38, p. 299).

Further, the Development and Welfare Report for 1940-42 stresses the need for security of land tenure in respect to land rented from private land owners. This Report confirms that there can be no agricultural advance or a contended peasantry until the relations of landlord and tenant are placed on a satisfactory basis which provides for compensation for unexhausted improvements; this reform is one of the most urgent for agriculture in the British West Indies (43, p. 36).

Thus, if a tenant has secure title to land and water rights, he may lengthen his expectations and combine resources for optimum efficiency. Written leases, rather than oral, registered in a court provide a basis of common agreement about the length of lease, the sharing of the cost of production, and the distribution of returns. Only in this way can a tenant hope to assert an identity in community activities and regain his human dignity.

2. High fixed costs to operator

Like uncertainties from conditions of tenure, high fixed costs to operator present an obstacle to agricultural development. The present scarcity of cleared cultivable land on the coastal belt of Guyana together with the population pressure places landowners in a superior economic position. They can charge tenants exorbitant rents over and above the marginal value productivity of resources. High rents, therefore, violate one of the cardinal conditions for economic efficiency that factor rewards be in accordance with marginal productivities (13, p. 324). Tenants, operating under high fixed costs, have no incentives to organise resources at an optimum level since such costs skew the allocation of resources which, in turn, impair the efficiency of labour and capital. Partly because of this agrarian defect an operator cannot save enough to uplift his family from the low income equilibrium trap that is indicative of an underdeveloped economy like Guyana (26, p. 100). Because of this agrarian defect, per capita income continues to be low in the agricultural sector.

On utilising the findings of a recent study of the rice industry in British Caribbean Islands and Guyana undertaken by Kundu, we find that fixed costs such as basic rent, maintenance of land, drainage and irrigation rates represent 16.0 and 23.0 percent of the total production cost of paddy per acre for small and large farmers respectively. The average revenue that

they obtain per acre is $136.00 and $95.00 while the production costs are $120.07 and $81.19 respectively (25, p. 265). This means that the net revenue obtained per acre is minimal according to Table 4, and may be incompatible with the marginal criteria of efficiency, when we consider that the rice industry is the largest user of land resources in Guyana. To increase agricultural efficiency and to realise equal income distribution, resources have to be allocated within each farm so that the marginal value productivities (MVP) of the resource services are equal to the respective prices of the resource service. A unit of labour or capital should not be used for rice if it can produce greater value product in sugar. This efficiency condition can be symbolically stated as: $MVP_N = P_N$, $MVP_K = P_K$, $MVP_L = P_L$ where the resource prices P_N, P_K, and P_L are opportunity costs. In this way every factor is rewarded according to its contribution when there is an optimum factor product combination.

Further, to improve the efficiency of agricultural production and the distribution of factor returns as a means of achieving both the economic and noneconomic ends of agrarian development, resources must be substituted in such a way that the ratio of the marginal physical product of each pair of resources is equal to their respective price ratios. This condition can be symbolically states as:

$$\frac{MPP_N}{P_N} = \frac{MPP_K}{P_K} = \frac{MPP_L}{P_L}$$

Table 4. Production cost of paddy per acre in British Guiana (in Guyana dollars)[a]

	Small farmer[b] $G	Large farmer[c] $G
Pre-sowing cultivation	25.25	19.05
Sowing and transplanting	27.22	6.69
Post-sowing cultivation	--	2.22
Reaping	25.00	27.99
Thrashing of crop	14.66	
Transport from field to mill	5.40	3.60
Drying of paddy	2.70	1.80
Rent (basic)	10.00	10.00
Maintenance of land	5.40	5.40
Drainage and irrigation rates	3.51	3.51
Miscellaneous transport charges	.93	.93
Total	120.07	81.19
Average yield of paddy per acre (lbs.)	2,800	1,960

[a]Source: (26, p. 265).

[b]Small farmer = All hand labour, rice transplanted.

[c]Large farmer = Fully mechanised, wet cultivation method.

It defines the last cost combination of productive services for a given level of production. Finally, the services of a resource must be allocated between competitive products such that equal marginal value productivities are achieved, i.e.

$$MVP_{N,\ X_1} = MVP_{N,\ X_2} = MVP_{N,\ X_3} = \quad MVP_{N,\ X_n}$$

where N represents labour allocated to the production of various agricultural crops, X_1, X_2, X_3, ... X_n. This condition implies, given the availability of resources, maximum production.

Some form of legislation to put a ceiling on farm rent on the basis of farm produce could provide incentive conditions to encourage optimum allocation of both landlord and tenant's resources. Provision has to be made for cash rents to reflect price changes and the uncertainty of weather conditions and of pest attack on crops.

3. Lower uses of land arising from pattern of ownership

The question of land utilisation constitutes another form of agrarian defect. In large estates where the rearing of livestock is the predominant mode of agricultural pursuit land is used rather extensively and inefficiently. Existing alongside such estates are small holdings which are cultivated intensively. The several cattle ranches and sugar estates on the narrow coastal strip occupy high quality lands so that a significant portion of the agricultural labour force have no

other alternative but to cultivate land of lower productive potential. Without sufficient funds and facilities to increase soil fertility cultivators will realise a lower marginal value productivity and concomitantly lower incomes. This violates the necessary conditions for economic development which will indicate changes in economic and social institutions so as to provide incentives for increased productive efficiency and more equal income distribution. Heady remarks:

> "Large estates are not necessarily inefficient from the standpoint of individual owners, given the extreme inequality of income distribution which exist in most areas where the phenomenon occurs. Also, the goal of an individual owner may not be the maximization of return from his holding but rather some acceptable level of income combined with social prestige and a minimum of management effort" (16, p. 53).

In an extensive plantation economy agricultural production is not adjusted to the demand for food, particularly foods of high nutritional value. Under given income distribution levels such demand cannot be expressed, but if income were equitably distributed, the choice indicators would be at the disposal of more people. This would then cause a shift in the allocation of resources, providing the large holdings are rationally operated.

In contradistinction, the intensive plantation sugar economy through supply-increasing and cost-reducing technologies realises high productivity yields and profits. This

industry employs about 20,000 workers at an average wage rate of $27.00 per week and has over 115,000 acres under sugar cane cultivation. It is also highly capital intensive and is export-oriented catering for metropolitan stockholders. Its credit and marketing arrangements and infrastructure are more highly developed than peasant production. Thus, this industry, provided with the necessary incentives, capital, and technology imported from abroad, continues to be competitive and viable. Thomas poignantly remarks:

> "The industry makes large and rapid expansions in its utilised acreage and output; it pays substantial dividend rates, it raises no new capital abroad; at the same time it uses absolutely less labour; it pays absolutely less taxes, and its investment rate is below the average size of the sector.... And, since the industry is foreign owned this represents a continuing net outflow of the nation's resources. The explanation of how this immiserising condition continues unabated is to be found in the institutional organisation of the industry" (44, p. 13).

It is evident from Table 5 that the yields of cane per acre fluctuated between 31.5 and 40.2 tons due to the application of technology, incentives and capital. The yield per acre in the rice industry, on the other hand, fluctuated between 0.90 and 1.2 tons, and the contributory factors for this low productivity may be due largely to the insufficient amount of native capital, incentives and technology.

Further, Table 6 represents the basic information on the profitability of the sugar industry for the period 1956-66. During this period net profits for sugar alone amounted to

Table 5. Sugar - acreage, output, and yield[a]

Year	Acreage reaped	Tons of cane ground	Tons of sugar produced	Recovery rate: tons of cane per ton of sugar	Yields of cane per acre (tons)	Yields of sugar per acre (tons)
1956	74,028	2,788,329	258,615	10.78	37.7	3.49
1957	81,339	2,901,129	280,177	10.35	35.7	3.44
1958	84,788	3,406,124	300,419	11.34	40.2	3.54
1959	87,658	3,167,523	280,097	11.31	36.1	3.20
1960	96,248	3,677,454	329,044	11.18	38.2	3.42
1961	105,821	3,507,354	319,938	10.96	33.1	3.02
1962	98,455	3,381,748	320,381	10.56	34.3	3.25
1963	95,076	3,352,318	311,588	10.76	35.3	3.28
1964	93,089	2,936,527	253,559	11.58	31.5	2.72
1965	103,085	3,297,136	299,809	11.00	32.0	2.91
1966	99,059	3,183,863	278,010	11.45	32.1	2.80
1967	102,900	3,758,678	343,572	10.94	36.5	3.33
1968	100,635	3,502,439	316,848	11.05	34.8	3.15

[a]Source: (45, p.10).

Table 6. Finances of the sugar industry (in million Guyana dollars)[a]

Year	Sugar company assets	Capital employment in the industry	Issued share capital	Revenue of the industry	Dividends	Profits after tax and depreciation	Profits after tax and depreciation (before replacement)
1956	44.7	45.8	17.5	48.5	1.3	5.6	4.5
1957	53.4	44.6	17.5	59.7	3.1	7.7	6.8
1958	57.0	46.1	17.5	58.5	1.7	6.9	6.0
1959	61.7	47.0	17.5	54.7	1.3	5.6	4.5
1960	68.2	48.8	21.1[b]	62.3	2.6	6.1	5.2
1961	72.9	48.2	32.9	64.5	2.3	5.8	4.8
1962	68.7	45.9	32.9	63.1	11.0 (7.2)	13.6	5.8
1963	77.0	56.3	32.7	81.2	6.7	8.9	8.2
1964	73.6	56.6	32.7	59.4	2.2	4.9	4.4
1965	73.2	60.1	32.7	60.4	0.9	3.4	2.0
1966	84.3	64.1	32.7	60.9	1.2	2.6	1.8

[a]Source: (45, p. 20).

[b]No new issue of bonus shares for 1960–1966.

$54m. or $5m. per annum. This gave an average ratio of issued share capital to profit after tax of 28.0 percent. For this same period, the net profits in sugar plus income from other investments of the companies showed a total profit of $71m. or $6.5m. per annum. This, in turn, gave a significant ratio of issued share capital to profits including income from other investments of 37.0 percent (44, p. 21). Using our equation on page 11, we find that since output and outflow increased in the sugar industry for the period 1956-66, the amount of savings for domestic investment purposes declined since the net beneficiaries were metropolitan stockholders, i.e. $Y_s\uparrow - C_s - \Phi_s\uparrow + P_s = S\downarrow = I\downarrow$. This continuing outflow of capital from the Guyanese economy definitely slows the pace of agricultural and national economic development. An underdeveloped country like Guyana urgently needs capital to accelerate its development and cannot afford massive outflow of it.

Various forms of land taxes and the redistribution of extensive plantations into smaller units for intensive uses may prevent underemployment of land. With regard to the sugar plantations government should demand at least 50.0 percent of the shares in order to contain some profits at home to meet urgent development needs. For instance, with more capital, incentives and technology, the agricultural sector can improve

its productive efficiency and income distribution which may carry over into other sectors thereby contributing to national economic development.

4. Small holdings

This defect, too, in agrarian structures is not only peculiar to Guyana but also throughout the Third World. It represents one of the most perplexing problems of the underdeveloped world since an operator has too little acreage to support a family at or above the subsistence norm. This structure breeds insecurity, poverty, and servility and provides the operator with an attitude of fatalism. There can be no substantial improvement in labour efficiency since virtually no capital can be saved, and operators of such holdings have no wherewithal to secure an education in order to gain nonfarm employment. Small holdings, moreover, prevent the use of technological development in terms of mechanisation, drainage, soil and pest control, etc., and consequently limit agricultural productivity and perpetuate low farm income. They undoubtedly exclude any opportunity to the operator and his family for improved levels of living and upward social mobility. The inheritance system of equal division of land together with population pressure aggravates the situation of undersized holdings (54, pp. 8-15).

In Berbice, O'Loughlin observes that undersized holdings with respect to size of rice acreage and not by total size of

farms are greatest (34, p. 127). This finding epitomises the serious defect of cultivated small holdings since the rice sector in Guyana is the largest user of land resources, followed by the sugar industry. It uses over 300,000 acres of land (See Tables 7, 8, and Appendix A), or 50.0 percent of the crop land when we consider that about 1.0 percent of the total land area, confined to the Coastland, is cultivated. It is interesting to note from Table 7 that 51.6 percent of the holdings cultivated were under 4.0 acres, and these engendered resource inefficiencies for labour and capital.

Included in the category of small holdings are non-contiguous tracts. From time immemorial the inheritance system provides for the division of property among children. Agriculture has been a way of life for the Guyanese people for about two centuries and as such great cultural ties are attached to land. Despite the sentiments attached to land, the inheritance system tends to promote fragmentation of holdings which become uneconomic units since they are scattered over the landscape. This factor is also partly responsible for the immobility of labour in agriculture. The unavailability of arable land, coupled with population density on the Coast-land, leads to more parcellisation of holdings. The cost of operating noncontiguous units is relatively high vis-a-vis a consolidated holding. The time lost in moving seeds, animals, and manures to various tracts reduces the efficiency of labour.

Table 7. Size and number of rice farms in British Guiana[a]

Size (Acres)	Berbice (Number)	Demerara (Number)	Essequibo (Number)	Total (Number)	Percentage
Under 2	4,229	1,363	832	6,424	23.8
2.3-3.9	5,119	1,182	1,245	7,546	27.8
4.0-7.9	4,383	1,869	2,283	8,535	31.5
8.0-15.9	1,365	1,269	944	3,578	13.5
16.0-31.9	207	388	31	626	2.3
32 and over	35	229	10	274	1.1
Total	15,338	6,300	5,345	26,983	100.0

[a]Source: (34, pp. 125-126).

Table 8. Acreage and production of some important agricultural crops, 1968 and 1969[a]

Type of crops	ACREAGE		
	1968	1969	Increase or decrease from 1968 (acres)
Sugar: TOTAL	107,450	126,030	+18,580
(i) Estates	99,916	116,181	+16,265
(ii) Farmers	7,534	9,849	+ 2,315
Rice	313,135	279,303	-33,832
Coconuts[b]	45,425	46,085	+ 660
Citrus[c]	5,392	5,609	+ 217
Coffee[c]	3,120	3,123	+ 3
Cocoa[c]	1,966	1,967	+ 1
Ground provisions[d]	7,950	8,795	+ 845
Plantains[c]	13,520	14,320	+ 800
Bananas[c]	2,050	2,940	+ 890
Corn[d]	2,200	2,598	+ 398
Cabbages[d]	117	148	+ 31
Blackeye peas[d]	305	348	+ 43
Pineapples[d]	219	300	+ 81
Tomatoes[d]	575	798	+ 223
Tobacco[d]	224	220	- 4
Peanuts[d]	30	58	+ 28

[a] Source: (31, p. 10).

[b] Exclude dry nuts used for home consumption, crude oil production and green nuts consumed as water nuts.

[c] Estimate of acreage under cultivation include bearing and none bearing trees.

[d] Estimate of acreage reaped.

Unit of Production	PRODUCTION 1968	1969	Increase or decrease from 1968 (acres)
Tons Sugar	316,848	364,465	+ 47,617
" "	295,335	339,534	+ 44,199
" "	21,513	24,931	+ 3,418
Tons Rice	136,690	110,857	- 25,833
No. nuts	55,206,000	60,805,000	+5,599,000
lbs.	20,759,200	21,840,400	+1,081,200
"	2,870,400	1,508,000	-1,362,400
"	64,750	65,700	+ 950
"	43,725,000	52,940,600	+9,215,600
"	47,320,000	48,860,900	+1,540,900
"	11,275,000	12,684,700	+1,409,700
"	2,990,000	3,897,000	+ 907,000
"	585,000	698,700	+ 113,700
"	175,000	270,600	+ 95,600
"	2,803,000	2,980,700	+ 177,500
"	3,047,500	3,142,900	+ 365,400
"	179,000	218,700	+ 39,700
"	30,000	63,800	+ 33,800

Noncontiguous tracts cannot accommodate the use of machinery and modern techniques of farm management. Smith points out that in Guyana the Roman-Dutch system allows persons to retain undivided rights in a plot of land whilst his co-heirs retain their rights with a possibility of exercising them at some future date, or passing them on to someone else (42, pp. 71-75).

Improving the intensive margin by consolidation, thus bringing new lands into cultivation on the extensive margin, can lead to optimum resource combination. Such a measure, recognising the fears and suspicions of farmers, may prove useful to accelerate agricultural and national development. Through various cooperative practices under a consolidation programme, cultivators can operate large holdings and realise economies of scale, particularly in the areas of production, purchasing and marketing. This is only possible, however, when they have the necessary incentives, capital, and knowledge.

A change in the inheritance system can also be useful to attain the above objective. If one heir cultivates a family plot while the others seek nonfarm employment, this will tend to prevent fragmentation of holdings into uneconomic units. Legislation alone is not effective to deal with the problem of small holdings because it requires a cautious approach. The United Nations Department of Economic Affairs reports:

> "Progress under special measures to deal with uneconomic small holdings has, on the whole, been negligible.... Action in this field can best be taken within the framework of a many sided policy, attempting to foster gradual change in the agrarian structure by counteracting the tendencies which produce excessive small farms" (54, p. 193).

5. High fixed costs of operating capital

Consistent with the foregoing defects in agrarian structures is the high cost of operating capital in terms of interest and payment. This leads to reduced efficiency in capital and labour. The individual cultivator cannot reach the optimum level of enterprise combination and resource allocation which would be indicated in the Hicksian theory of the firm. Even if the cultivator should choose a new technique, high fixed costs of operating capital might limit the extent to which he could add variables to push production along the production function to the point where his marginal cost is equal to his marginal revenue. High interest payments compel the cultivator to restrict his techniques of production although he might be aware of better seed varieties or weed control practices (18, pp. 66-74). Therefore, he is inclined to limit borrowing partly because in the event of a crop failure he would like to meet his debt and partly because he would like to retain his farm. If the introduction of a new seed variety should fail, it means that a farmer's livelihood

is threatened since his plot of land is the only means through which he ekes out an existence.

O'Loughlin reports that private loans vary from a relative to a private moneylender (34, p. 142). In the former case there is usually no interest payment but only principal repayment while in the later case interest payments vary between 11.0 to 12.0 percent whereas the bank interest rate is 8.0 percent. Private mortgages, too, fluctuate between the rates of 8.0 to 15.0 percent. There is a markup of prices on farming inputs. These rates are probably higher today and are an obstacle to agricultural and economic development because in most cases farmers tend to dispose of their crops as soon as they are harvested in order to meet their indebtedness to merchants, millers, landlords, and moneylenders including pawnbrokers. In a sample survey of the rice industry in the counties of Berbice and Demerara, O'Loughlin finds that farmers are heavily indebted and that their net incomes are relatively low according to Tables 4 and 9. Since per capita income in the agricultural sector is low, it is likely that the rate of savings will be low. The disposal of crops immediately after harvest results in lower prices and returns to farmers who will continue to realise low incomes and savings.

With proper credit and marketing structures in the form of rural cooperatives and milling and warehouse facilities supervised by the central government, farmers would be inclined

Table 9. Credit: Original loan and amounts outstanding at date of visit to farm (in Guyana dollars)[a]

District and size (acres)	Cooperatives		Stores		Sellers of equipment		Miller	
	o.l.[b]	s.o.[c]	o.l.	s.o.	o.l.	s.o.	o.l.	s.o.
East Coast Demerara								
0-9.9	1,251	732	142	142	--	--	137	37
10-49.9	4,265	3,660	654	471	5,000	5,000	213	213
50-99.9	--	--	--	--	2,100	800	1,250	920
100+	650	450	1,301	1,201	5,642	2,742	--	--
West Coast Demerara								
0-9.9	1,920	1,822	--	--	--	--	60	60
10-49.9	570	300	--	--	--	--	-	-
Berbice								
0-9.9	1,325	1,225	1,036	1,024	--	--	150	65
10-49.9	3,430	2,937	670	650	4,300	2,300	142	142
50-99.9	1,460	1,310	110	10	6,395	6,265	300	300
100+	--	--	1,540	1,540	--	--	2,000	2,000

[a] Source: (35, p. 140).

[b] o.l. = Original loan.

[c] s.o. = Still owing.

Landlord		Bank		Private		Mortgage (house or land)		No. of farms indebted
o.l.	s.o.	o.l.	s.o.	o.l.	s.o.	o.l.	s.o.	
--	--	--	--	75	75	6,670	4,770	6
162	162	--	--	360	360	19,400	17,900	11
--	--	--	--	--	--	--	--	1
--	--	8,000	8,000	4,500	4,500	28,100	17,225	8
--	--	--	--	--	--	16,880	13,570	10
--	--	--	--	--	--	6,260	5,360	4
--	--	240	100	1,100	1,000	--	--	4
82	82	10,450	5,060	5,200	2,756	13,300	11,200	11
--	--	1,680	1,480	--	--	3,960	3,710	5
--	--	--	--	7,000	4,000	--	--	1

to dispose of their crops at competitive prices rather than immediate disposal after harvest. Further, they would be inclined to make needed investments and adjustments in farm enterprises so that resource combinations would be consistent with their marginal value productivities. In this way, the efficiency of agricultural production and the distribution of factor returns would facilitate the attainment of both the economic and noneconomic ends of agrarian development. Binns asserts:

> "There is no reasonable doubt that in many underdeveloped countries a static or even retrogressive condition of agriculture has as a major cause a simple lack of ready money in the hands of the farmer" (2, p. 30).

Farmers, in order to get medium or long term credit, according to a recent Ministry of Agriculture report, have to provide a collateral security of about 1.3 times the value of the loan sought, and it is easier to get loans for nonagricultural projects (31, p. 7). Loans should be made on the basis of productivity rather than collateral security. In order to increase productivity it will require a low interest rate, for a high interest rate definitely tends to reduce productivity. A national credit institution can also be effective to channel domestic savings and provide ready money for productive purposes at low interest rates in order to realise the goals of economic development stated by and for the society. Exorbitant interest rates charged by landlords, and moneylenders are an obstacle to general economic development (49, p. 43).

6. High fixed costs of ownership

Apart from the agrarian defects identified so far, high fixed costs of ownership are contributory factors hindering agricultural development. Milk notes that two of the major costs involved in owning land are the taxes imposed on such ownership and the interest payments being made for the purchase of land when the owner does not possess full equity in his property (29, p. 180). High interest rates on long-term capital tend to discourage capital investment and to favour production programmes and crops which are projected over a shorter time and are labour intensive. Similarly, steep tax rates may also have an adverse effect on the farm unit as they will reduce incentives for investment and, hence, foster a shift to shorter term enterprise combinations. Raup observes that "a severe burden of taxation" can inhibit private investment in agriculture, and reduce potential production (39, pp. 245-269). Landlords, because of their economic position, can easily shift taxes to tenants. This form of regressive taxation will drive tenants' levels of living below the subsistence norm. The West India Royal Commission Report for 1945 points out that excessive rentals are charged to peasants, and that some peasants have been charged unconscionably high prices, especially for small parcels of land (61, p. 43). Moreover, an operator who is trying to become an owner, faces difficulties in obtaining credit and in meeting high cost of

such credit. Agricultural development cannot proceed successfully if high costs of ownership become a restraining vehicle.

Changes in the tax structure to provide incentives to invest and discourage under cultivation would not only provide operators with some form of security and stability but also direct resources to particular crops. In this way agricultural development would be geared to overall economic development since the outflow from agriculture would tend to have multiplier effects on the other sectors.

C. Factors Affecting Agrarian Structures

The remaining part of this chapter will deal with the factors affecting agrarian structures. These factors are responsible to a large extent for low productivity and low income in agriculture.

1. Lack of knowledge

Related to the foregoing defects in agrarian structures is lack of knowledge which can inhibit economic growth. The accumulation and application of knowledge is of fundamental importance to total development. Since agricultural development is a subset of economic development, it is imperative that individual cultivators be kept fully informed about physical possibilities and institutional forms in order to reach the optimum efficiency for their labour. Lewis reasons:

> "If new knowledge is to be accepted and applied to production, it must be profitable as well as new. It takes effort to acquire knowledge, and to apply it may require both extra resources and also extra willingness to bear risks. The application of knowledge therefore demands an institutional pattern which associates differential effort with differential reward" (27, p. 180).

A low level of education tends to breed low techniques of production and thus conspires to maintain low productivities and low incomes. It is significant to note from Tables 10a, 10b, and 11 that only the sugar industry, and to a limited extent, the rice industry, use fertilisers to increase production. These two industries constitute the 'backbone' of the Guyanese economy, particularly the agricultural sector. A typical cultivator's tool kit comprises a cutlass, a hoe, a shovel, and a plough. He is assisted by draught animals in the process of cultivation. In more progressive enterprises, however, the tool kit is quite different. It comprises a tractor, a few ploughs, and a combine. Even in these progressive enterprises a substantial amount of human labour is necessary for the broadcasting of seeds, planting and manuring of sugar canes, and harvesting of crops. The sugar industry uses light aircrafts, as a labour-saving device, to spray the canes. To increase productivity and to realise more widespread per capita income distribution, it is necessary to have technological change which reduces costs. Technological change offers major potential for changing the position and shape of the production function not only in increasing total output and

Table 10a. Quantities of fertilisers imported, 1964 to 1969 (in tons)[a]

Year	Types imported				Total
	Nitrogenous	Phosphatic	Potassic	Others	
1964	18,608	2,635	2,005	907	24,155
1965	23,204	3,309	1,237	532	28,282
1966	24,676	2,655	2,025	1,110	30,466
1967	30,256	2,706	2,774	747	36,483
1968	28,004	3,559	3,018	1,459	36,040
1969	23,436	2,527	2,872	1,396	30,231

[a]Source: (31, p. 6).

Table 10b. Quantities of fertilisers used in the sugar industry, 1968 to 1969 (in tons)[a]

Types	1968				1969			
	Sugar estates	Farmers	Total	% of Total	Sugar estates	Farmers	Total	% of Total
Nitrogenous	23,194	1,832	25,026	78.4	24,840	2,296	27,136	79.2
Phosphatic	2,728	314	3,042	9.5	3,158	202	3,360	9.8
Potassic	3,437	157	3,594	11.3	3,352	176	3,528	10.3
Others (including mixed)	239	32	271	0.8	204	31	235	0.7
Total	29,598	2,335	31,933	100.0	31,554	2,705	34,259	100.0

[a]Source: (31, p. 6).

Table 11. Fertilisers and limestone used on sugar estates, 1966 to 1969[a]

Types of Fertilizers	1966 Quantity (tons)	1966 % of Total	1966 Value $	1967 Quantity (tons)	1967 % of Total	1967 Value $
Nitrogenous						
Sulphate of Ammonia	21,474	64.4	2,265,606	23,779	53.8	1,964,519
Urea	588	1.8	105,981	1,546	3.5	272,096
Diammonium Phosphate	--		--	35	0.1	7,029
Phosphatic						
Super Phosphates	1,194	3.6	170,179	1,167	2.6	178,961
Hyper-phosphates	1,813	5.4	128,088	1,628	3.7	120,747
Potassic						
Muriate of Potash	2,385	7.1	252,455	2,304	5.2	245,455
Mixed						
Compound	--		--	84	0.2	13,059
15-15-15	--		--	--		--
Nitro Phoska	--		--	5		843
Others	119	0.4	18,514	--		--
Limestone and Shell						
Ground	5,766	17.3	116,722	8,512[b]	19.2	236,564
Shell (marine)	--		--	5,160[b]	11.7	61,920
Shell lime	--		--	--		--
T O T A L	33,339	100.0	3,057,545	44,220	100.0	3,101,193

[a] Source: (31, p. 11).

[b] Previously this was included under ground limestone.

1968			1969		
Quantity (tons)	% of total	Value $	Quantity (tons)	% of total	Value $
21,285	43.3	1,732,659	23,128	44.5	1,870,121
1,906	3.9	355,660	1,690	3.3	307,225
3		516	22		4,840
1,291	2.6	242,327	1,476	2.8	299,879
1,437	2.9	124,329	1,682	3.2	165,420
3,437	7.0	390,286	3,352	6.5	398,925
--	--	--	--	--	--
45	0.1	7,284	--	--	--
194	0.4	25,604	204	.4	34,998
--	--	--	--	--	--
14,699	29.9	448,094	14,793	28.4	464,667
4,561	9.3	72,976	5,674	10.9	79,436
278	0.6	7,334	--	--	--
49,136	100.0	3,407,068	52,021	100.0	3,625,511

marginal productivity of labour but also in providing the incentive for an increase in the total labour input and thereby having a magnified effect on output.

Research programmes can help facilitate the exchange of information to overcome resource inefficiencies in agriculture due primarily to a lack of knowledge. The dissemination of technical information through agricultural extension services can help overcome this particular factor affecting agrarian structures.

2. Occupational immobility

Closely related to the above factor affecting agrarian structures is occupational immobility. In the agricultural sector there is a tendency for considerable under-employment of tenant and owner-occupier cultivators. A substantial proportion of the landless labour, too, is unemployed. The lack of alternative employments or the lack of knowledge of other avenues of employment compounds the problem for the agricultural sector in that an excess supply of labour is likely to be present. This excess supply tends to reduce resource efficiency particularly labour. The current 3.0 percent rate of population increase together with over 68.0 percent of the inhabitants concentrated in rural areas suggests that unemployment rate in rural areas will persist. According to a United Nations estimate the average rate of registered

unemployed will continue to be in the vicinity of 7.5 percent (59, p. 185). This figure, however, may not truly reflect the unemployment rate because a sizeable proportion of the unemployed do not bother to register with the Labour Department, coupled with the fact that rampant discrimination exists in employment practices.

The United Nations preliminary report on world social conditions lists the following major obstacles to labour mobility:

(a) Lack of reliable and adequate information concerning job opportunities and working and living conditions in other occupations and areas.

(b) Personal resistance to a change of occupation or residence or both, including the tendency for workers to carry on their father's trade as a tradition.

(c) Lack of necessary skill to fill the available jobs and of adequate and suitable training and retraining facilities to develop and adapt skill.

(d) Cost involved in changing from one occupation or area to another.

(e) Restrictions on entry into various occupations.

(f) Differentials in wages, working conditions and the cost of living from one occupation, industry and area to another.

(g) Lack of suitable housing in areas with job opportunities.

(h) Lack of transport means.

(i) Discrimination in employment, based on sex, creed, colour, age, disablement, etc. (56, p. 114).

Some form of resettlement of the dense population on the Coastal Belt or the introduction of light industries may provide

the necessary incentive conditions for increasing the marginal value productivity of labour in agriculture and for allocating the scarce resources of society in an efficient manner to promote economic growth.

3. Depletion of soil resources

In conjunction with the two factors dealt with earlier, the depletion of soil resources is a contributory factor to low agricultural productivity. The insecurity of land and water rights coupled with high fixed cost of capital specially directs the resource owner to exploit the soil in order to ensure full returns on investments made. There is no supervisory body per se that directs farmers to engage in soil conservation practices. Present land tenure systems permit unrestrained exploitation of the soil and environment. A Netherlands study sums the low level coast as:

> "A chain of erosion and accretion alternating with remarkable regularity. Even though big rivers intersect the coastline, the pattern remains undisturbed" (22, p. 165).

This condition requires large capital expenditure for irrigation and drainage schemes which are prerequisites for the successful development of the Coastland.

The concept of a trusteeship of resources advocated by Timmons and Cormack could help control erosion and fertility loss which are the most damaging diseases of the land. They define this concept thus:

> "It would consider the person or entity in control of a particular parcel of land as the trustee of the resources associated with this land on behalf of society, including both its present and future members. This form would emphasize responsibilities to society in the use of land resources and the environment instead of the traditional concept of freedom to exploit and pollute" (51, p. 16).

In this way rights and privileges in regard to the use of land resources and environment would be commensurate with duties and responsibilities. It would help reduce social overhead capital for drainage, irrigation, and a communications network, providing farmers have the correct attitudes to conserve soil resources. This measure can also be useful to boost agricultural productivity and income since the economies realised from a trusteeship can be transferred to modernise traditional agriculture.

4. Lack of legal machinery for agrarian problems

Similarly, this factor, like the others, is a serious obstacle to economic growth. Agricultural development cannot proceed in a vacuum because society consists of many heterogenous parts which have reciprocal relationships. Changes in the agricultural sector definitely exert their influences on the economic, social, and political sectors. Passage of laws, for instance, may be futile if no adequate machinery is worked out to implement such laws. Vested interests will certainly like to perpetuate the status quo by resisting major agrarian

reform measures. Peasants with low incomes cannot get legal redress for inequities and settlement of disputes. Ramsahoye notes that the difficulties involve:

> "Emergence of a hybrid legal system resulting from the gradual reception of English law while the Roman Dutch law was in force and the jurisprudential problems created by the mixture of principles of Roman-Dutch law, the English common law of personal property, equity, and statute" (38, p. 9).

Although legislation has been enacted to meet the needs of a developing nation, land law continues to pose numerous problems. A comprehensive and unified land law is necessary to promote national economic development.

Adequate and stable judicial provisions would serve as a catalyst for economic development. Individual entrepreneurs would be provided with a favourable social climate to undertake investments. Agricultural cultivators would be able to secure future returns from present action, thus giving effect to the economic incentives set up by various agrarian reform measures. A special Land Court or Review Board will enable individuals to obtain redress from alleged injustices arising from the administration of an agrarian reform. Such a body can help minimise the time and expenses that individual cultivators would normally undergo to get judicial review.

5. Rapid population growth

A compounding element with the principal agrarian defects is rapid population growth. To disentangle the factors

responsible for the acute population growth of 3.1 percent during the decade 1960-69 is extremely difficult. However, reference must be made to the efforts of the 1920's through the 1940's which influenced the mortality and fertility rates. Improved medical facilities and sanitation contributed to an increase in the average life expectancy. Smith observes:

> "Whereas the average life expectancy in 1920-22 was 35.5 years for men and 35.8 years for women, by 1950-52 it had risen to 53.15 years for men and 56.28 years for women" (41, pp. 8-9).

According to a United Nations report, by 1960-65 the average life expectancy was 59.03 years for men and 63.01 years for women whereas the crude birth and death rates were 37.2 and 7.2 respectively (53, p. 120). In short, the net effect of improved medical facilities, sanitation, and nutritional foods contributed to a dramatic decline in the mortality rate from 19.4 in 1941-45 to 7.9 in 1964-69 and to an increase in the birth rate from 34.4 in 1941-45 to 37.2 in 1964-69. The vital relevant statistics are shown in Table 12 and Appendix B. The very effective D.D.T. campaign carried out in 1945-57 against malaria, which resulted in its almost complete eradication on the Coastal Belt was a contributory factor to the accelerated population growth. Giglioli, the malariologist, observed:

> "In this Colony, perhaps more than elsewhere, the connection between agriculture and malaria is intimate; there can be no doubt that the prevailing forms of cultivation, rice and sugar cane, influence the malaria problem adversely.... Thus ideally favourable breeding sites are

Table 12. Vital statistics rates and natural increase rates, 1964 to 1969 exclusive of Amerindian (rates per 1,000)[a]

Year	Total	Natural increase			
		Births	Total	Deaths	Total
1964	23,836	39.8	5,069	8.5	18,767
1965	23,176	37.7	5,046	8.2	18,130
1966	25,396	40.2	5,277	8.4	20,119
1967	23,743	34.7	4,895	7.2	18,848
1968[b]	24,579	36.7	5,391	8.1	19,188
1969[c]	23,276	33.8	5,179	7.5	18,097

[a]Source: (32, pp. 74-75; 53, p. 120).

[b]Revised.

[c]Provisional.

Rate	Total population	Males	Females	Life expectancy 1959 - 1961 Male	Female
31.3	606,313	302,615	303,698		
29.5	622,407	310,066	312,341		
31.8	641,691	310,639	322,052	59.03	63.01
27.5	658,145	327,635	330,510		
28.6	676,757	337,025	339,732		
26.3	645,296	346,257	349,039		

> provided for mosquitoes, at all seasons, and breeding continues the year round with greater or lesser intensity, according to the temperature and the individual characteristics of each species[1]" (12, pp. 75-81).

At present the man-land ratio is about eight per square mile and thus it appears that the country is underpopulated. If, however, one considers that over 90.0 percent of the inhabitants live on the flat and narrow coastal plains, one gets a high man-land ratio of about 175 as opposed to 0.9 per square mile in the interior. It is this area that potentially presents a reincarnation of the Malthusian trap if nothing is done to devise suitable alternatives to accommodate the rapidly growing population or to reduce the procreation rate. A preliminary count arising from the Population and Housing Census taken of April 7, 1970 has revealed that the population of that date was 714,233, an increase of almost 28.0 percent on the 1960 population figure of 560,330 (9, p. 7).

The development of land settlement schemes on a cooperative basis and the opening up of the interior, making land available on a large scale primarily for cattle raising and mixed farming would eventually absorb the bulging coastal population. If, however, population growth continues as it is, and the majority of the population remains concentrated on the 'unilinear' coastland, the practical approach would be to

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[1]Anopheles darlingii was the chief vector of malaria.

introduce demand-decreasing technology. A 2.0 percent reduction in the population growth rate through birth control technology would have far-reaching effects on the economy. Assuming the economy achieves its projected growth rate of 7.5 percent in the present decade and with a population rate of 1.1 percent instead of 3.1 percent, then the real per capita growth would be 6.8 percent, an increase of 5.3 percent which would be over and above the problematic gap of 1.0 percent. This indicates that a substantial proportion of the population would now become producers rather than mere consumers. Agriculture might contribute more to the national product, thereby increasing the distribution of income in that sector. With feedback effects the nonagricultural sectors would benefit so that in general total per capita income would increase. This goal requires a large level of investment in order to become self-sustaining and cumulative.

Some form of compulsory savings such as the removal of subsidies on public undertakings (e.g. railways, shipping and postal services) which do not cover their annual operating expenses, the purchase of Treasury Savings Certificates or Debentures, the formation of cooperatives, and the initiation of self-help projects are necessary to meet urgent developmental needs. Increased per capita income is a reasonable proxy for economic growth.

V. ANALYSES OF THESE PROBLEMS IN TERMS OF AMELIORATIVE ALTERNATIVES

The purpose of this chapter is to analyse the problems delimited and diagnosed in the previous chapter in terms of ameliorative alternatives. It is hoped that through these remedial alternatives or expansion of success elements agricultural development can effectively take place. A transformation of the Guyanese economy would in all likelihood promote economic growth. We shall deal with these alternatives sequentially to the problems identified in Chapter IV.

A. Removing Uncertainties Arising From Conditions of Tenure

Modifications in agrarian structures to provide incentives for the cultivator to increase his productivity may take several forms. Timmons has articulated that improving tenancy conditions can offer security, fair returns, assurance of future returns for present investments, and improved levels of living for cultivators (49, p. 6). Written leases by stipulating minimum leasing periods or requiring compensation will increase the certainty of expectation for individual cultivators. Such leases will replace tenancy arrangements which would ordinarily be determined by oral contract. With extended economic horizons cultivators can effect efficient allocation of resources, costs and returns within farm enterprises so as to fulfill the necessary conditions for agricultural develop-

ment. If the marginal rates of substitution between inputs and products are equal to their price ratios, then only will there be an optimum and efficient allocation of resources. This condition entails, according to Heady that the share of the factor of variable input must be the same as the share of output obtained from it, equal shares of all products, each resource owner must receive the marginal value product of the resources he contributes, and each resource owner must have opportunity to receive return on investment made in one production period but not forthcoming until a subsequent period (16, p. 167). Cash rental payment rather than kind is preferred. It should be adjusted to take account of price changes and of harvests in lean years.

Inheritable leases, too, serve as an important means to lengthen a cultivator's planning horizon, since leases written and registered in a court provide some form of stability and security of expectations to both landlord and tenant. Thus, a tenant can make needed investments without fear that his heirs may not be able to realise the returns. If, however, a landlord decides to repossess occupancy, adequate provision should be made for compensation and for disturbance. Liversage points out:

> "Security should extend beyond the life of the sitting tenant or his heirs, as an important element in the endeavors of an occupier, particularly towards the latter part of his life, is provision for his family. If he cannot provide for them in the land, he will try the more to

> provide for them in the bank, and what goes into the bank may come out of the land" (28, p. 111).

Moreover, the promotion of owner-occupier can substantially reduce the uncertainties which arise when a tenant is not sure he will realise benefits in the future arising out of present efforts. Through compulsory purchase and redistribution, the government can provide landless farm labour with ample plots from which they can derive an adequate and stable means of livelihood. In this process of redistribution care must be taken to curb any speculation that may arise because such high prices will become capitalised in the land. This represents a severe burden to new owner-occupiers who will have to cope with high amortisation payments. Landlords whose lands have been expropriated would be compensated by non-negotiable bonds, for negotiable bonds which are equivalent to ready cash can produce inflationary effects on the economy. These landlords should be encouraged to invest their newly realised wealth in local industrial ventures rather than export it abroad. The new owners of land should be restricted to sublet their plots.

B. Relating Fixed Costs to Productivity

Not only will security of tenure promote agricultural development, but also legislative action will reduce exorbitant rents. Backed by a strong legal machinery, the government can control exploitative landlords. There should be a ceiling on

farm rent based on land's principal produce, and this, in turn, should not dampen an operator's incentive in respect to farm efficiency. For instance, to increase per capita productivity, according to Figure 4, it is necessary to have low fixed costs; high fixed costs tend to dampen productivity. Thus, the length of a loan should be tied to the optimum planning period of a product and should be based on productivity rather than collateral security. The repayment schedule should vary proportionately in periods of high and low productivity so as to avoid hidden credit charges with an original payment plan.

Another possibility is to encourage the farm population to seek nonfarm jobs so as to reduce the pressure on land as a capital investment. In this way returns to resources in agriculture would increase and could boost national economic development.

C. Improving the Pattern of Ownership

Improving tenancy and high fixed costs would be meaningless to promote agricultural development if land is not efficiently and optimally utilised. The underemployment of land retards the rate of agricultural development towards economic efficiency. The farm population not only has to use land of lower productive quality but also to face unsatisfactory conditions of employment. Consequently, they have no sense of responsibility or initiative in farm management.

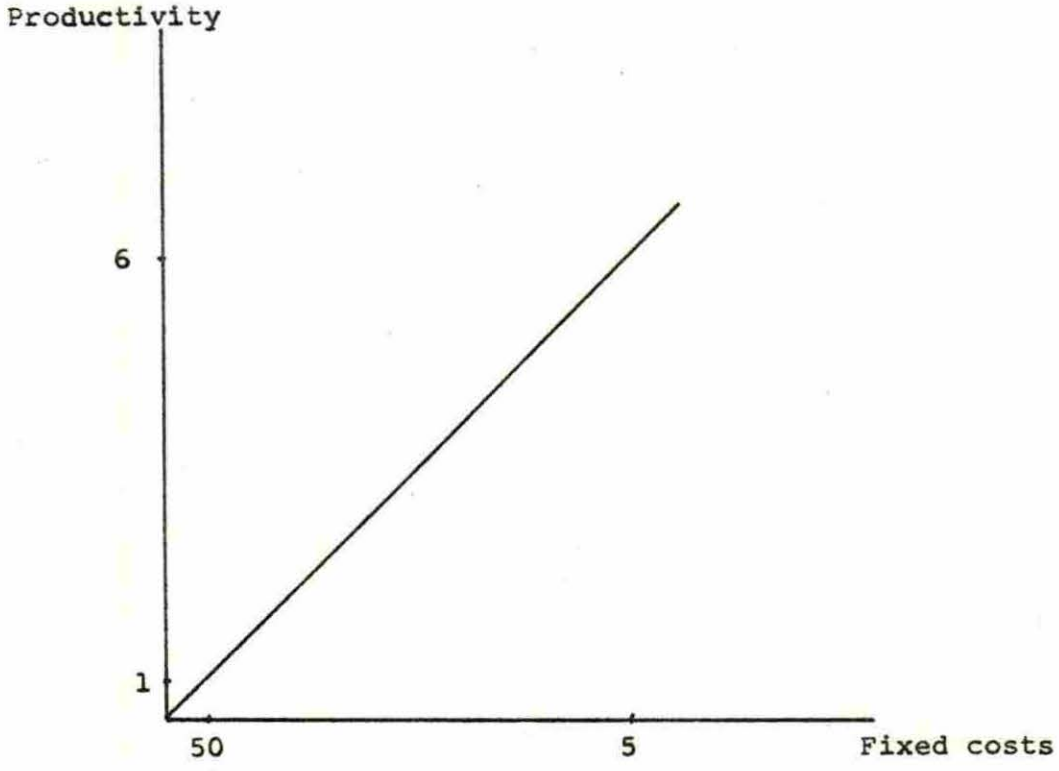

Figure 4. Relating fixed costs to productivity

When lands are redistributed to small or landless peasants, the breaking up of the extensive plantation economy becomes inevitable on social grounds. This redistributive measure, with or without adequate compensation to expropriated landlords, undoubtedly instils in new holders a degree of responsibility to cultivate their plots in an efficient manner. Farm incomes would tend to increase as yields increase on the more productive lands. With bigger incomes farm people can improve their standards of living though this may be difficult to measure but will be in line with social progress.

A single tax on land as advocated by Henry George may provide the incentive for efficient utilisation of land (11, p. 135). This form of incentive taxation may become an important means to stimulate more intensive cultivation of lands and at the same time provide government with a reliable source of revenue which can be used to erect infrastructures. Progressive tax measures and equal share participation by government in the sugar plantations would tend to reduce the flow of the nation's resources abroad. The share participation should be a transitional step towards eventual nationalisation of the sugar industry. Foreign exchange generated by this industry could then be used to purchase machinery, fertilisers, seeds, etc. from abroad to boost agricultural and industrial development, which in turn, can help accomplish the economic and noneconomic ends of national development.

D. Increasing Size of Holdings

To aid agricultural development the problem of small holdings has to be tackled as an integral part of agrarian reform. Although undersized holdings represent an intractable agrarian defect, there are some reform measures which will help reduce the severity of the problem. A consolidation of holdings will provide cultivators with a larger base to operate on and will subsequently make substantial improvements in labour efficiency. Small plots of rice and mixed farming lands can substantially become efficient units of production if they are brought together and are cultivated intensively.

Another remedial measure is to bring these holdings under various cooperative practices. Where the cooperative farm is encouraged, the basis would be broadened for the creation of sufficient opportunities for greater diversification and employment since large grouping makes possible the initiation of suitable industries to meet the needs of agriculture. In the areas of purchasing, marketing, storage, and cultivation the voluntary group effort will realise increased efficiency through a more effective use of capital and a specialisation of labour. Through cooperative enterprises cultivators can obtain the necessary information to increase their efficiency. The Guyanese Prime Minister unequivocally declares:

> "Our basic proposition is this: the organisation of our human and material resources through the cooperative movement with Government providing

> financial assistance, management, training and administrative direction. The small man will, through the cooperative, be able to own large and substantial business enterprises and make decisions which will materially effect the direction which the economy takes and where the country goes" (5, p. 9).

Cautious legislation is needed to change the inheritance system and to define the optimum farm size in order to cope effectively with this agrarian defect. One heir, for example, can retain control of the entire holding while the other heirs are encouraged to seek nonfarm employment but are still entitled to receive their proportionate share on the holding. Through this means further fragmentation cannot take place.

Improving the extensive margin by empoldering and reclaiming land is another alternative. It is also least controversial. There will have to be some trade off between economic optimum and social stability. This is consistent with our means-ends continuum. Timmons remarks:

> "The master goals of economic policy consist of (1) maximization of the social product, and (2) optimization of income distribution. Land use goals fall largely within the broader economic goals of the maximization of the social product over time, while land tenure goals fall more with the broader economic goal of income distribution" (48, p. 271).

Since land institutions are created by man and are not sacred, they can be changed to meet societal goals which must be placed above an individual's goals. To accommodate such a change at a magnitude and tempo necessary in realising social

progress and economic growth, a minimum stability threshold becomes a top priority. Without it, agrarian reform cannot effectively take place since the Guyanese people have been largely conditioned by the British to the democratic institutions of government.

The foregoing ameliorative measures will be thwarted amidst the presence of noncontiguous tracts. Under conditions of excessive fragmentation not only labour efficiency is impaired but also land improvement. Under consolidation or combination of noncontiguous tracts, however, this can be overcome. Cultivators will have large units and can practise maintenance measures such as crop rotation, soil conservation, and weed and pest control. They can introduce technical and managerial innovations if they have the necessary incentives emanating from other agrarian reform measures. The net effect of combining scattered tracts will then be to increase resource productivity when the marketing channels and infrastructural base become efficient through the process of technological change. A land tenure conference reports:

> "Consolidation tries to offset the ill effects of fragmentation on agricultural productivity, thus affecting not only the income of the individual farmer, but also the national output of farm products in any given state. A consolidation scheme usually deals with the regrouping of holdings among the existing farmers. At the same time in most countries the road, irrigation, and drainage systems are overhauled and brought up to standard. Sometimes some reclamation work is done on land of poor quality" (62, unpaged).

E. Improving Operating Capital

To promote agricultural development through agrarian reform, a regular and steady source of credit at low interest rates for peasants is a prerequisite. This measure calls for modification in the money market so that agrarian credit institutions can improve the formation of and the access to capital. With easy access to capital, individual peasants can attempt the optimum position of enterprise combination and resource allocation. They will tend to introduce new techniques of production since the costs of obtaining credit do not become a burden to impair efficiency. In this way agricultural productivity will increase; farm incomes will also rise. Maximum legal interest rates commensurate with the marginal value productivity of capital will help accomplish this objective.

The formation of rural credit and marketing agencies in the interest of peasant agriculture will curb usurious moneylenders. Farmers will no longer have to dispose of their crops immediately after harvest at below market prices to meet interest payments but can hold their crops until a favourable marketing period. There is also a tendency for foreign commercial banks to provide loans much easier for nonagricultural purposes, and their investments for the most part are made outside of Guyana (6, p. 17). Thus, through cooperative practices small farmers can receive mutual benefits. Working

together they can, for instance, reduce fixed operating costs and forge strong feelings of camaraderie. Imbued with a sense of responsibility for prompt payment of interest and repayment of loans, they will certainly inculcate habits of thrift and saving. Such attitudes can play an important role in accomplishing the economic and noneconomic ends of national development, for it is through savings that capital becomes available for productive purposes. If sufficient savings are generated within the country, then factor payments will remain there to promote further development. This is only possible, however, if the monetary authorities through various instruments regulate the flow and direction of capital within the domestic economy. Excessive 'leakages' of scarce domestic capital into foreign corporations or money markets can seriously limit the pace of economic development, and even agricultural development.

For cooperatives to be successful the government has to provide the necessary funds and expertise in the initial stages. Its constant supervision is also necessary to make the concept of a cooperative republic of Guyana an accomplished goal. To forge the 'cooperative spirit' as a way of life for a developing Guyana requires heavy investments in human and nonhuman resources. Spontaneous development of cooperatives must befit the social matrix of the country. Cooperative techniques imported and foisted on the Guyanese people are

doomed to failure when there is a low acceptance of them. The cooperative idea must not merely be a political slogan for sheer expediency, because it can jeopardise the development targets set by and for society.

F. Reducing High Fixed Costs of Ownership

The overcoming of the problem of high fixed costs of ownership can be an impetus to the remedial alternatives, noted earlier, in the pursuit of agricultural development. This particular agrarian defect will require similar measures in some respects as the foregoing category. Through cooperative agencies an individual cultivator can borrow long-term capital at a reduced rate. He will thus be encouraged to introduce capital-intensive methods into his farm enterprise and to cultivate crops over a longer time period. Diversification of agricultural products can become an important feature during this adjustment period. Many agricultural commodities that are imported could be advantageously grown locally, thereby boosting farm incomes and per capita income in agriculture (31, p. 28). Appendix C itemises some of these commodities and their returns. Moreover, if these commodities could be produced locally and economically, this would tend to curtail the 'leakage' of domestic capital abroad and improve the balance of payments position of the country.

Incentive forms of taxation can also boost agricultural development. Allowances for cleaning trenches, innovating on

holdings, and building dams can be made to imaginative farmers as instances of preferential treatment. Special taxes should be levied on lands that remain idle in order to overcome resource inefficiencies arising from the pattern of ownership. It should be remembered, too, that any form of long-term capital and taxation must always facilitate an operator to become an owner. If such a measure is on the contrary, it can be termed retrogressive from the standpoint of an operator since it conflicts with the goals of agrarian reform.

VI. FINANCING AGRARIAN REFORM IN GUYANA

This chapter deals with a specific model that may be useful to promote agricultural development through agrarian reform in Guyana. The purpose of this model is to derive analytically some estimate of the cost of financing agrarian reform in Guyana and to examine the feasibility of land transfers in the light of the present and expected future macroeconomic conditions underlying the Guyanese economy. Available empirical data will aid the analysis, and the methodology used in this model is essentially the same Thorbecke used in the 1963 Peruvian Study (45, pp. 1-7).

The first magnitude to be estimated in this model is the value of the land subject to transfer of ownership (either through expropriation or voluntary sale). In order to make this estimate the average value per acre of cultivated and cultivable land and of natural pastures has to be computed. Most of the lands subject to transfer or redistribution are located on the densely populated coastland and the hinterland of Guyana. The areas and values of such lands are shown in Table 13. As a rough approximation one can take the figure of Y million dollars as the total value for X million acres of land subject to transfer under the government long-term strategy for economic development.

Now, suppose the procedure for land transfer and land financing is to compensate the present landlords by means of

Table 13. Land areas and values by types of land[a]

Locality/Project	Cultivated and cultivable lands (in thousand acres) (1)	Natural pasture (in thousand acres) (2)	Cost per acre of (1) (in dollars) (3)
Black Bush Polder project	A	B	a
Canje project	C	D	c
Mahaica-Mahaicony Abary project	E	F	e
Boerasirie extension project	G	H	g
Tapakuma project	L	M	l

$$Aa + Bb + Cc + Ee + Ff + Gg + Hh + Ll + Mm = Y$$

$$\text{Value of cultivated and cultivable land} = \frac{Aa + Cc + Ee + Gg + Ll}{A + C + E + G + L} \text{ dollars.}$$

$$\text{Value of natural pasture per acre} = \frac{Bb + Dd + Ff + Hh + Mm}{B + D + F + H + M} \text{ dollars.}$$

where A + B = 31,000 acres
C + D = 500,000 "
E + F = 520,000 "
G + H = 109,000 "
L + M = 35,000 "
Total 1,195,706 = X

[a]Source: Computed.

Cost per acre of (2) (in dollars) (4)	(1) x (3) Value of land (in million dollars) (5)	(2) x (4) Value of land (in million dollars) (6)
b	Aa	Bb
d	Cc	Dd
f	Ee	Ff
h	Gg	Hh
m	Ll	Mm

bonds (B) carrying an interest rate of r_{pl} percent and amortisable in t years by annual lottery drawings. Further, suppose the new landowners would pay for their land (D) over a period of not less than t years and be charged an interest rate of r_{nl} percent per annum.

Thus, if the repayment scheme of the new landowners takes place over a term of exactly t years, the government would not use any funds for land transfer purposes, since every year the inflow of funds from the new landlords would be exactly equal to the redemption of bonds. The only direct cost attributable to land transfer would be the interest rate differential of $r_{pl} - r_{nl}$ where r_{pl} = payment to bond holds or present landlords and r_{nl} = earnings from new landlords.

There are, of course, a number of indirect costs which have to be incurred simultaneously with land transfers and which are basic to the success of agrarian reforms. These costs would include: 1) short-term production credit to purchase inputs such as fertilisers, insecticides, seeds, cattle, 2) medium or long-term credit for construction, irrigation, farm improvement and other purposes, and 3) public expenditures for technical assistance extension and the building of necessary social overhead capital projects. These costs are as difficult and as risky as estimating the average farm size.

In any case, the fiscal implications in terms of the government receipts and payments on principal and interest resulting from land transfers over time, can be worked out. It is necessary to make such calculations in order to evaluate the financial feasibility of a land reform programme and to assess the capacity of a country to complete this type of programme.

The specification of our model is now necessary to determine the quantitative effects of land transfer on the government's budget. The model is based on the following assumptions:

1. The total value of the land subject to transfer is Y million dollars which also provide a margin for: a) the administrative costs of executing the programme, b) a few of the essential inputs and services to the new settlers, and c) a slight cushion against possible inflationary pressures which would reduce the purchasing power of the land bonds.
2. Land would be transferred over a n-year period so that each year Y/n million worth of land would change ownership and, therefore, that bonds totalling Y/n million dollars would be issued annually for n years.
3. These bonds would be redeemed over a t-year period from their date of issue and carry a r_{pl} percent interest rate.
4. The new landlords would purchase their land over a (t+n) year period and pay r_{nl} on the unpaid balance, allowing them n_{gp} year as "grace period".

On the basis of the above assumptions, the fiscal implications of this land transfer scheme could be worked out. This is illustrated schematically in Table 14 which provides annual figures for a planning period of t years, the length of time necessary to complete the financing of the scheme. It not only shows the government annual outflows (expenditures) and inflows (revenues) but also government net expenditures (or receipts) on principal (Column 8), interest (Column 9), and principal plus interest (Column 10).

To complete the model it is necessary to state the aggregate growth rate of GDP for the Guyanese economy. To this end, it is suffice to postulate a reasonable investment ratio (Net Investment ÷ GDP) and incremental output-capital ratio(ΔGDP ÷ Δ capital stock). Thus, the rate of growth of GDP is equal to the product of the investment ratio and the incremental output-capital ratio.

Symbolically, $\frac{\Delta Y}{Y} = \frac{\Delta GDP}{GDP} = \alpha\delta$, where

$$\alpha = \frac{\text{Net Investment}}{GDP} \quad \text{and} \quad \delta = \frac{\Delta \text{ GDP}}{\Delta \text{ capital stock (= Net Investment)}}$$

thus: $\alpha\delta = \frac{\text{Net I}}{GDP} \times \frac{\Delta \text{ GDP}}{\text{Net I}} = \frac{\Delta GDP}{GDP}$. For example, in 1969 $\frac{\Delta GDP}{GDP} = \frac{20.4}{291.4} = 5.2$ percent, and using 1964 as the base year, the GDP grew at 4.7 percent for the period 1960-1969.

If we quantify the model in millions of dollars by letting Y = 370.37, X = 1.2 million acres, n_{gp} = 4 years, n = 10 years,

Table 14. Government costs of land transfer operation (in million Guyana dollars)[a]

Year	(1/t_{+n} of land amortised) government inflow	(1/t of bonds redeemed) government outflow	Total value of land transferred-bonds issued	Bonds outstanding at end of year	Indebtedness of new landlords at end of year
n_{GP_0}			.Y	B_0	D_0
n_{GP_1}		.Y/t	.2Y	B_1	D_1
n_{GP_2}		2(.Y/t)	.3Y	B_2	D_2
n_{GP_3}		3(.Y/t)	.4Y	B_3	D_3
n_4	.Y/t+n	4(.Y/t)	.5Y	B_4	D_4
n_5	2(.Y/t+n)	5(.Y/t)	.6Y	B_5	D_5
n_6	3(.Y/t+n)	6(.Y/t)	.7Y	B_6	D_6
n_7	4(.Y/t+n)	7(.Y/t)	.8Y	B_7	D_7
n_8	5(.Y/t+n)	8(.Y/t)	.9Y	B_8	D_8
n_9	6(.Y/t+n)	9(.Y/t)	Y	B_9	D_9
t_{10}	7(.Y/t+n)	10(.Y/t)		B_{10}	D_{10}
t_{11}	8(.Y/t+n)	"		B_{11}	D_{11}
t_{12}	9(.Y/t+n)	"		B_{12}	D_{12}
t_{13}	10(.Y/t+n)	"		B_{13}	D_{13}
t_{14}	"	"		B_{14}	D_{14}
t_{15}	"	"		B_{15}	D_{15}
t_{16}	"	"		B_{16}	D_{16}
t_{17}	"	"		B_{17}	D_{17}
t_{18}	"	"		B_{18}	D_{18}

[a]Source: Computed.

Annual interest on bonds outstanding (r_{PL} percent)	Annual interest receipt from new landlords (r_{PL} percent)	Excess of government outflow (+) on principal [(inflow (-)] Col. 2-1	Excess of government outflow (+) on interest [(inflow (-)] Col. 6-7	Annual excess of government outflow over inflow Col. 8+9
$r_{PL}B_0$	$r_{NL}D_0$		$r_{PL}B_0-r_{NL}D_0$	$r_{PL}B_0-r_{NL}D_0$
$r_{PL}B_1$	$r_{NL}D_1$	.Y/t	$r_{PL}B_1-r_{NL}D_1$	.Y/t+($r_{PL}B_1-r_{NL}D_1$)
$r_{PL}B_2$	$r_{NL}D_2$	2(.Y/t)	$r_{PL}B_2-r_{NL}D_2$	2(.Y/t)+($r_{PL}B_2-r_{NL}D_2$)
$r_{PL}B_3$	$r_{NL}D_3$	3(.Y/t)	"	"
"	$r_{NL}D_4$	4(.Y/t)-.Y/t+n	"	"
"	$r_{NL}D_5$	5(.Y/t)-2(.Y/t+n)	"	"
"	"	6(.Y/t)-3(.Y/t+n)	"	"
"	"	"	"	"
"	"	"	"	"
"	"	"	"	"
"	"	"	"	"
"	"	"	"	"
"	"	"	"	"
"	"	"	"	"
"	"	"	"	"
"	"	"	"	"
"	"	"	"	"
"	"	"	"	"
"	"	"	"	"

Table 14 (Continued)

Year	(1/t+n of land amortised) government inflow	(1/t of bonds redeemed) government outflow	Total value of land transferred-bonds issued	Bonds outstanding at end of year	Indebtedness of new landlords at end of year
t_{19}	"	"		B_{19}	D_{19}
t_{20}	"	"		B_{20}	D_{20}
t_{21}	"	9(.Y/t)		B_{21}	D_{21}
t_{22}	"	8(.Y/t)		B_{22}	D_{22}
t_{23}	"	7(.Y/t)		B_{23}	D_{23}
t_{24}	"	6(.Y/t)		B_{24}	D_{24}
t_{25}	"	5(.Y/t)		B_{25}	D_{25}
t_{26}	"	4(.Y/t)		B_{26}	D_{26}
t_{27}	"	3(.Y/t)		B_{27}	D_{27}
t_{28}	"	2(.Y/t)		B_{28}	D_{28}
t_{29}	"	.Y/t			D_{29}
t_{30}	"				D_{30}
t_{31}	"				D_{31}
t_{32}	"				D_{32}
t_{33}	"				D_{33}
t_{34}	9(.Y/t+n)				D_{34}
t_{35}	8(.Y/t+n)				D_{35}
t_{36}	7(.Y/t+n)				D_{36}
t_{37}	6(.Y/t+n)				D_{37}

Annual interest on bonds outstanding (r_{PL} percent)	Annual interest receipt from new landlords (r_{PL} percent)	Excess of government outflow (+) on principal [(inflow (-)] Col. 2-1	Excess of government outflow (+) on interest [(inflow (-)] Col. 6-7	Annual excess of government outflow over inflow Col. 8+9
"	"	"	"	"
"	"	"	- "	"
"	"	"	- "	"
"	"	"	- "	"
"	"	"	- "	
"	"	- "	- "	
$r_{PL}B_{25}$	"	- "	- "	
$r_{PL}B_{26}$	"	- "	- "	
$r_{PL}B_{27}$	"	- "	- "	
$r_{PL}B_{28}$	"	- "	- "	
	"	- "	- "	
	"	- "	- "	
	"	- "	- "	
	"	- "	- "	
	"	- "	- "	
	"	- "	- "	
	"	- "	- "	
	"	- "	- "	
	"	- "	- "	
	"	- "	- "	

Table 14 (Continued)

Year	(1/t+n of land amortised) government inflow	(1/t of bonds redeemed) government outflow	Total value of land transferred-bonds issued	Bonds outstanding at end of year	Indebtedness of new landlords at end of year
t_{38}	5(.Y/t+n)				D_{38}
t_{39}	4(.Y/t+n)				D_{39}
t_{40}	3(.Y/t+n)				D_{40}
t_{41}	2(.Y/t+n)				D_{41}
t_{42}	.Y/t+n				

Annual interest on bonds outstanding (r_{PL} percent)	Annual interest receipt from new landlords (r_{PL} percent)	Excess of government outflow (+) on principal [(inflow (-)] Col. 2-1	Excess of government outflow (+) on interest [(inflow (-)] Col. 6-7	Annual excess of government outflow over inflow Col. 8+9
	$r_{NL}D_{38}$	- "	- "	
	$r_{NL}D_{39}$	-4(.Y/t+n)	- "	
	$r_{NL}D_{40}$	-3(.Y/t+n)	- "	
	$r_{NL}D_{41}$	-2(.Y/t+n)	- "	
		- .Y/t+n	- "	

t = 20 years, r_{pl} = 0.5 percent, and r_{nl} = 0.2 percent, we can find the cost of financing agrarian reform.

By the first assumption, then, the total value of land subject to transfer is 370.37 which also provides a margin for a) the administrative costs of executing the programme, b) a few of the essential inputs and services to the new settlers, and c) a slight cushion against possible inflationary pressures which would reduce the purchasing power of the land bonds.

By the second assumption, land would be transferred over a ten-year period so that each year 37.03 worth of land would change ownership and, therefore, that bonds totalling 37.03 million dollars would be issued annually for ten years (Column 3).

By the third assumption, these bonds would be redeemed over a twenty-year period from their date of issue and carry a 5.0 percent interest rate.

By the fourth assumption, the new landlords would purchase their land over a thirty-year period and pay 2.0 percent on the unpaid balance, allowing them a four-year "grace period".

Given these assumptions, Table 15 provides annual figures for a forty-three-year period - the length of time necessary to complete the financing of the scheme - of the annual government outflows (expenditures) as well as the government inflows (revenues) by categories. Of particular significance

Table 15. Government costs of land transfer operation (in million Guyana dollars)[a]

Year	(1/30 of land amortised) government inflow	(1/20 of bonds redeemed) government outflow	Total value of land transferred-bonds issued	Bonds outstanding at end of year	Indebtedness of new landlords at end of year
0			37.03	37.03	37.03
1		1.85	74.07	72.22	74.07
2		3.70	111.11	105.55	111.11
3		5.55	148.14	137.03	148.14
4	1.23	7.40	185.18	166.66	183.92
5	2.46	9.25	222.22	194.44	218.51
6	3.70	11.11	259.25	220.37	251.85
7	4.94	12.96	296.29	244.44	283.70
8	6.17	14.81	333.33	266.66	314.81
9	7.41	16.66	370.37	287.03	344.44
10	8.64	18.51		268.51	335.77
11	9.88	18.51		248.14	325.92
12	11.11	18.51		231.48	314.81
13	12.35	18.51		212.96	302.44
14	12.35	18.51		194.44	290.11
15	12.35	18.51		175.92	277.77
16	12.35	18.51		157.40	265.40
17	12.35	18.51		138.88	253.07
18	12.35	18.51		120.37	240.74

[a]Source: Computed.

Annual interest on bonds outstanding (5 percent)	Annual interest receipt from new landlords (2 percent)	Excess of government outflow (+) on principal [(inflow (-)] Col. 2-1	Excess of government outflow (+) on interest [(inflow (-)] Col. 6-7	Annual excess of government outflow over inflow Col. 8+9
1.85	0.74		1.11	1.11
3.61	1.48	1.85	2.13	3.98
5.27	2.22	3.70	3.05	6.75
6.85	2.96	5.55	3.89	9.44
8.33	3.67	6.17	4.67	10.84
9.72	4.37	6.79	5.35	12.14
11.01	5.03	7.41	5.98	13.39
12.22	5.67	8.02	6.55	14.57
13.33	6.29	8.64	7.04	15.68
14.35	6.88	9.25	7.47	16.72
13.42	6.71	9.87	6.71	16.58
12.50	6.51	8.63	5.99	14.62
11.57	6.29	7.40	5.28	12.68
10.64	6.04	6.16	4.60	10.76
9.72	5.81	6.16	3.91	10.07
8.79	5.55	6.16	3.24	9.40
7.87	5.30	6.16	2.57	8.73
6.94	5.06	6.16	1.88	8.04
6.01	4.81	6.16	1.20	7.36

Table 15 (Continued)

Year	(1/30 of land amortised) government inflow	(1/20 of bonds redeemed) government outflow	Total value of land transferred-bonds issued	Bonds outstanding at end of year	Indebtedness of new landlords at end of year
19	12.35	18.51		101.85	228.37
20	12.35	18.51		83.33	216.03
21	12.35	16.66		66.66	203.70
22	12.35	14.81		51.85	191.33
23	12.35	12.96		38.88	179.00
24	12.35	11.11		27.77	166.66
25	12.35	9.25		18.51	154.29
26	12.35	7.40		11.11	141.96
27	12.35	5.55		5.55	129.62
28	12.35	3.70		1.85	117.25
29	12.35	1.85			104.92
30	12.35				92.59
31	12.35				80.22
32	12.35				67.88
33	12.35				55.55
34	11.11				44.44
35	9.88				34.55
36	8.64				25.92
37	7.41				18.51

Annual interest on bonds outstanding (5 percent)	Annual interest receipt from new landlords (2 percent)	Excess of government outflow (+) on principal [(inflow (-)] Col. 2-1	Excess of government outflow (+) on interest [(inflow (-)] Col. 6-7	Annual excess of government outflow over inflow Col. 8+9
5.09	4.56	6.16	0.53	6.69
4.16	4.32	6.16	-0.16	6.00
3.33	4.07	4.31	-0.74	3.57
2.59	3.82	2.46	-1.23	1.23
1.94	3.58	0.61	-1.64	- 1.03
1.38	3.33	- 1.24	-1.95	- 3.19
0.92	3.08	- 3.10	-2.16	- 5.16
0.55	2.83	- 4.95	-2.28	- 7.23
0.27	2.59	- 7.80	-2.32	-10.12
0.09	2.34	- 8.65	-2.25	-10.90
	2.09	-10.50	-2.09	-12.59
	1.85	-12.35	-1.85	-14.20
	1.60	-12.35	-1.60	-13.95
	1.35	-12.35	-1.35	-13.70
	1.11	-12.35	-1.11	-13.44
	0.88	-11.11	-0.88	-11.99
	0.69	- 9.88	-0.69	-10.57
	0.51	- 8.64	-0.51	- 9.15
	0.37	- 7.41	-0.37	- 7.78

Table 15 (Continued)

Year	(1/30 of land amortised government inflow	(1/20 of bonds redeemed) government outflow	Total value of land transferred- bonds issued	Bonds outstanding at end of year	Indebtedness of new landlords at end of year
38	6.17				12.33
39	4.94				7.40
40	3.70				3.70
41	2.46				1.22
42	1.23				

Annual interest on bonds outstanding (5 percent)	Annual interest receipt from new landlords (2 percent)	Excess of government outflow (+) on principal [(inflow (-)] Col. 2-1	Excess of government outflow (+) on interest [(inflow (-)] Col. 6-7	Annual excess of government outflow over inflow Col. 8+9
	0.24	-6.17	-0.24	-6.41
	0.14	-4.94	-0.14	-5.08
	0.07	-3.70	-0.07	-3.77
	0.02	-2.46	-0.02	-2.48
		-1.23		-1.23

to our study are Columns 8-10 since they represent, respectively, net government expenditures (or receipts) on principal (Column 8), interest (Column 9), and principal plus interest (Column 10). It is worthy to note that the annual outlays of the government for land transfer purposes progressively increase between Year 0 and Year 9, at which time they reach a peak of 16.72 million dollars (Column 10). These outlays then gradually decline until Year 22 (1.23 million dollars). In Year 23 the outflow is replaced by an inflow which keeps on increasing to a level of 14.20 million dollars in Year 30. From that time on, the inflow declines continuously to zero in Year 43.

To determine whether the magnitude of these figures is well within the fiscal capacity of the country, it is important to derive, first, the investment and incremental output-capital ratios. The projected rate of growth, 7.5 percent, will be equal to the product of these two ratios. The absence of relevant statistics in Guyana prevents a further numerical exercise, but, suffice to say, that projected total public outlays and public investment must be in harmony with the cost of financing agrarian reform. Moreover, the instruments and institutions of the Guyanese society must be able to support agrarian reform measures so that the developmental goals can be realised in an orderly and progressive manner. Reckless use of policy instruments can sow the seeds of internecine strife and

thus affect the stability threshold needed for economic development. It can also result in diminished per capita productivity and income distribution since the range of effective choices and opportunities can be seriously curtailed. Improvements in agrarian structures, which are substantially part of the institutional matrix, can become an important means to realise developmental goals set by and for the Guyanese society. Needed adjustments in land tenure institutions, for example, can provide the necessary incentives, capital, and knowledge to the agricultural sector so that continuous increases in agricultural productivity are possible. These adjustments, together with appropriate policy instruments, can become an effective means of providing the necessary conditions for achieving the objectives of economic development, which is an end-in-view in our means-ends continuum (Figure I). Agricultural development through agrarian reform is only a subset of this end-in-view. It has to be subservient to other higher ends-in-view, but should ultimately lead to the basic ends of society-life, liberty, and the pursuit of happiness.

VII. SUPPLEMENTARY MEASURES FOR EFFECTIVE AGRARIAN CHANGES

The various ameliorative alternatives suggested in Chapter V and the application of the model proposed in Chapter VI will be futile if certain factors persist in agrarian structures. These factors encompass lack of knowledge, occupational immobility, depletion of soil resources, absence of legal machinery for agrarian problems, and rapid population growth. Thus, the aim of this chapter is to suggest supplementary measures for effecting agrarian changes that may contribute to the realisation of the economic and noneconomic ends of society.

A. Improvement in Knowledge

To promote agricultural development an enlightened citizenry is of paramount importance. Farmers, in order to maximise economic objectives, must have a constant stream of information. Though they may have the necessary incentives and capital, they may not overcome resource inefficiencies when they do not have the necessary knowledge. Smith remarks that a literate people are always more decent and orderly than an ignorant and stupid one (41, p. 273). The availability and application of knowledge is the quintessence for social progress and political stability which are consistent with the goals of agrarian reform. Thus, improving farming techniques requires basic

research in soil and plant nutrition, genetics, farm management, etc. The emphasis here is on technical education rather than formal education for the Guyanese citizenry since most of them can read and write. A revamping of the educational curricula and a change of attitudes with respect to science and technology are necessary ingredients to promote agricultural development. A cultivator who is informed and intelligent will in most cases make sound decisions to overcome resource inefficiencies.

Extension services provided by the Ministry of Agriculture can be of tremendous importance to enlighten cultivators about seeds, fertilisers, pest eradication, flood control, and cropping and harvesting techniques. These will embrace yield-increasing and cost-reducing technologies. Periodic agricultural fairs and exhibitions in central locations of the country can be a fillip to innovations particularly in the agricultural sector. Farmers can have first-hand information on the impact of technological innovations, thus quelling their fears about new techniques of production.

Dissemination of information can also be done through existing agricultural institutions such as credit and producers' cooperatives. These intermediaries constitute the most convenient distributing system for conveying quickly to the agricultural population expert counsel and guidance. The individual transient expert can depend on organised farmers

for continuing implementation of his advice because of the 'oneness of spirit' that binds farmers together in cooperative structures.

Facilitating an improvement in knowledge will require a big slice of the national budget, for education is both a consumption and a productive good. The training and mobilising of the country's human resources, backed by a favourable social climate, could become a driving force towards the path of agricultural and economic development.

B. Occupational Mobility

Related to the preceding measure is occupational immobility. If rural migration is encouraged through land settlement schemes, this will tend not only to relieve the population pressure on the land but also to increase the marginal value product of the labour moved out and of the new farmers. This form of horizontal mobility will tend to result in greater agricultural output which, backed by competitive prices, will mean increases in farm incomes. If the increases in incomes are not dissipated on conspicuous consumption, then the rate of savings can be increased for farm households.

The introduction of cottage industries such as cotton, knit wear, tanning, basketry, etc., is another means to provide occupational mobility. This means would serve to reduce the economy's heavy dependence on sugar, rice, and bauxite industries and would facilitate the development target

of agricultural diversification (see Figure 2). If citizens are fully informed about job opportunities outside of the agricultural sector and are skilfully equipped, they can secure gainful employment. This measure could certainly increase resource productivity in agriculture. It can only be successful if rampant discrimination in employment, based on race, colour, and political affiliation, is virtually removed. The creation of an interior city can also become a 'pull factor' so as to break rural occupational rigidities. Rural youths with more universalistic attitudes can certainly gain vertical social mobility, providing a favourable social climate exists. Measures designed to foster the super-ordination of one ethnic group, without considering the complex and heterogeneous components of the Guyanese society, will ultimately fail to achieve political stability and social progress. The civil disturbances of the early 1960's failed to tap the energies of the masses but could serve as a reminder to policy makers. Throughout the process of economic development, a new vitality, not the seeds of 'race politics', is needed. A minimum stability threshold is therefore important to accommodate agrarian changes at a magnitude and a tempo necessary to realise social progress and economic growth.

C. Improving Soil Resources

The supplementary measures advocated thus far would be worthless if the problem of depletion of soil resources is

not tackled consciously as part of agricultural development. Improper care of soil resources will result in a diminution of agricultural productivity and a perpetuation of low farm incomes. It will also result in considerable public externalities since the individual resource owner has within his 'bundle of rights' unlimited freedom to exploit and pollute the soil and environment without compensation. If resource-owners have adequate knowledge about conservation and apply it, then the problem of soil and fertility loss and quality environment can be substantially minimised. Since the country is divided into the counties of Berbice, Demerara, and Essequibo, special conservation districts on a county basis would provide a means for mutual action towards common objectives. The conservation districts would set use and quality standards and would keep resource use within reversible limits.

A trusteeship of resources could curb unlimited rights and privileges. The central government vested with the powers to tax, to enact, to enforce, and to judge can bring about this structure to facilitate agricultural development. Pigou declares:

> "It is the clear duty of government, which is the trustee for unborn generations as well as for its present citizens, to watch over, and if need be, by legislative enactment, to defend the exhaustible natural resources of the country from rash and reckless spoliation" (37, p. 27).

In this way the central government could consciously instil in citizens the need for resource conservation and clean environment so that they could attain a quality of life that would accompany economic and social development.

D. Legal Machinery for Agrarian Matters

To strengthen the other remedial alternatives towards agricultural development, a strong legal machinery geared solely for agrarian matters is of vital importance. To deal with problems arising out of agrarian reform, a special Land Court or Review Board is a necessary institutional adjustment. The present chaotic system is due largely to fragmentation, abandonment of land and the transmission of interests for several generations without attempts being made to secure proper titles (38, p. 299). A cadastral survey and registration of rights will not only provide cultivators with certainty to extend their planning horizons consistent with optimum efficiency but will also facilitate the land reform agency to deal with agrarian problems fairly and accurately. Binns suggests a number of advantages of such a measure:

1. A proper system of cadastral survey and registration of rights is the essential basis of a real understanding of the agrarian situation in a country, and thus to the planning of any measure of agrarian reform.

2. Such a system is, if possible, even more important in the execution of any plan of reform which involves any disturbance or change of existing rights in land....
3. Large scale maps are essential to...schemes for the settlement of new lands.
4. Large scale maps (and usually registers of rights) are of the greatest value in carrying out the provisions of tenancy legislation involving control of rents or security to the tenant in his land and improvements.
5. Registration of rights greatly facilitates the operations of any scheme for the supply of agricultural credit, especially to small farmers (3, p. 5).

This complementary reform measure will also help unify the provisions of the Deeds Registry Ordinance and the Land Registration Ordinance to form part of a comprehensive code for the settlement of all agrarian disputes. This comprehensive instrument will then be of fundamental importance to ensure economic development in a stable and conducive environment. Landlords and tenants will become cognisant of their obligations, and the road to exploitation and resource inefficiency will be abandoned.

E. Population Control

To improve agricultural productivity and income requires a conscious policy towards the problem of rapid population growth. In order to make the various agrarian measures,

investigated earlier, effective, a reduction in the population growth rate is necessary if suitable alternatives are not immediately available to cope with the present high birth rate. According to Table 16 almost 47.0 percent of the total population of the country was under age 15 years in 1965, and this has serious consequences for economic development. High birth rates and low mortality rates bring about a high proportion of children and a small proportion of adults in the most productive age. This high dependency ratio is supported by the vital statistics in Table 13 where the crude birth and death rates are 37.2 and 7.2 (per 1,000) respectively. Thus, the economy has been diverting efforts and resources from increased future productive potential to current consumption needs. A high population growth of 3.0 percent reduces the possibilities of the economy to increase capital formation. To reduce the unemployment rate of 7.5 percent requires heavy investible funds since a larger labour force needs a larger stock of productive facilities. The current rate of domestic capital formation is correspondingly low to cope with the unemployment situation which conspires to inhibit the pace of agricultural and economic development.

To increase per capita income, therefore, requires as a practical approach, a reduction of the birth rate. A 2.0 percent reduction in the procreation rate will tend to close the problematic gap investigated. Birth control measures are

Table 16. Population by age, sex, and urban/rural residence[a]

Country	All Ages	Age in years -1	1 - 4	5 - 9	10 - 14
Guyana					
Total	560,330	21,636	76,541	90,948	70,103
Male	279,128	10,956	38,534	46,139	35,284
Female	281,202	10,680	38,007	44,809	34,819
Urban	87,017	2,545	9,151	11,173	9,593
Male	40,374	1,301	4,571	5,628	4,764
Female	46,643	1,244	4,580	5,545	4,829
Rural	473,313	19,091	67,390	79,775	60,510
Male	238,754	9,655	33,963	40,511	30,520
Female	234,559	9,436	33,427	39,264	29,990

[a]Source: (53, pp. 168-169).

15 - 19	20 - 24	25 - 29	30 - 34	35-39	40 - 44
51,884	42,157	39,959	32,458	29,003	23,767
25,405	20,678	17,294	16,009	14,436	11,942
26,479	21,479	18,665	16,359	14,567	11,825
8,167	6,741	5,929	5,476	5,024	4,422
3,909	3,159	2,626	2,497	2,178	1,894
4,258	3,582	3,303	2,979	2,846	2,528
43,717	35,416	30,030	26,982	23,979	19,345
21,496	17,519	14,668	13,602	12,258	10,048
22,221	17,897	15,362	13,380	11,721	9,297

Table 16 (Continued)

45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74
22,774	18,015	15,098	11,177	7,867	5,111
11,889	9,389	7,807	5,577	3,556	2,108
10,885	8,626	7,291	5,600	4,311	3,003
4,393	3,873	3,169	2,496	1,793	1,319
2,004	1,754	1,412	1,109	665	434
2,389	2,119	1,757	1,387	1,128	885
18,381	14,142	11,929	8,681	6,074	3,792
9,885	7,635	6,395	4,468	2,891	1,674
8,496	6,507	5,534	4,213	3,183	2,118

75 - 79	80 - 84	85 +	Unknown
3,155	1,671	1,006	
1,181	550	304	
1,174	1,121	702	
971	497	285	
268	133	68	Magnitude zero
703	364	217	
2,184	1,174	721	
913	417	236	
1,271	757	485	

far more effective to increase and sustain per capita income rather than to increase output pari passu with population growth. Even if land resettlement schemes and compulsory savings are undertaken, the population problem will still be present. The interior of the country is marked by numerous forests, mountains, and streams which limit the possibilities for productive human habitation in the immediate future. The development of the interior, too, will require heavy social overhead investments. Current domestic capital formation will not be adequate to meet these lumpy investments although self-help may be partly useful in any attempt to develop the interior. It is better to increase the stock of capital for the future generation rather than to exhaust it on the present generation.

Birth control information can be disseminated inexpensively through existing health clinics, hospitals, and social and cultural organisations. The Guyanese people, being literate and intelligent, can practise birth control methods if the facts of overpopulation on the coastland and its effects on economic development are brought to them in an ingenuous and dispassionate manner. Per capita income in the range of $276 (U.S.) cannot increase substantially if population growth continues unchecked. Moral restraint may be imperative because efforts to promote national economic development via increased

agricultural productivity and a more widespread income distribution will certainly be sabotaged by accelerated population growth.

VIII. FURTHER STUDIES NEEDED TO TEST AGRARIAN REFORMS

This study has focused primarily on agricultural development through agrarian reform in Guyana but has attempted, at the same time, to show the close and necessary interrelationships between agrarian reform and economic development. It was not until the aftermath of World War II and the threat of world communism that the Free World began to take an active part in initiating economic development in the less-developed countries. The problem of economic development in these countries revolves very largely around the problem of agrarian reform directed towards the modernisation of traditional agriculture. Guyana is no exception to this problem since per capita income and resource productivity are extremely low when compared with those of advanced economies such as the United States, Canada, and Japan. Defects in agrarian structures inhibit agricultural development and, hence, economic development. Thus, in formulating plans for national economic development, it is imperative that careful attention should be paid to the part agrarian reform may play throughout the development process.

Accordingly, in planning and executing agrarian reform in Guyana, the analytical framework and the analysis of problems and remedial alternatives in this study indicate certain guidelines for future action. These emphasise the crucial importance of agrarian reform in economic development which

encompasses agricultural development. Consequently, it is appropriate that no agrarian reform measure should be advocated or undertaken without a careful evaluation of its effect on national economic development. Much more information about agrarian reform measures and their economic effects, and about agrarian structures as they exist in Guyana, is needed so that effective and efficient alternatives could be taken to achieve the developmental goals. Such a stream of information can be an invaluable asset not only to the country itself, but also to the United Nations and friendly countries in planning their programmes of technical and economic aid.

This stream of information, however, is only possible through rigorous and intensive research. Little research has been done in Guyana particularly in the area of agrarian reform. This study has only provided an analytical framework, aided by available empirical data. There is a lack of specific analysis of the obstacles to agricultural development posed by defects in agrarian structures and their possible remedial alternatives. More research should delimit agrarian problems as they exist in Guyana, diagnose their extent, and propose remedial hypotheses. Careful evaluation of the effects of remedial measures should form a substantial part of the research. Such research should utilise the analytical tools available from the disciplines, particularly the social sciences. It will involve an inter-disciplinary approach to

problem-solving. The University of Guyana, working in close collaboration with government agencies and the University of the West Indies, could contribute significantly to this needed reservoir of knowledge. To be most effective, this research should be carried out in a cooperative spirit with research workers in international agencies and in various less developed countries, so that a typology of the obstacles to economic development posed by agrarian structures, together with their possible remedial alternatives, could emerge.

The several defects in agrarian structures and their remedial alternatives undertaken in this study pinpoint a wide area for more research. This area includes the following:

1. Insecure title with respect to land and water rights perpetuates resource inefficiencies and distorts the distribution of agricultural products between landlords and tenants, especially when the latter undertake long-term cultivation practices or capital improvements. Research is needed to determine remedial alternatives, the least expensive means of settling titles, and the costs and sources of funds for a title registration and settlement programmes.
2. Adequate credit is necessary to overcome many of the resource inefficiencies in the agricultural sector of Guyana. Credit obtained at exorbitant rates increases a farmer's operating costs and also puts him in a precarious

position when his crops are subject to perennial floods and insect attacks. Full use must be made of such remedial alternatives as legislative action, cooperative credit societies, and supervised credit programmes, in order to curb the usurious practices of landlords, moneylenders, and pawnbrokers so that farmers could combine resources efficiently to increase productivity.

3. Extensive plantations retard the rate of agricultural development towards economic efficiency and national development. Breaking up of extensive plantations and the distribution of these lands, with or without compensation to expropriated landlords, to small or landless peasants may become highly controversial. Therefore, care must be taken so that the stability threshold is not disturbed by such redistributive measure. The model presented in Chapter VI shows the macroimplications and cost of financing agrarian reform. Such cost must well be within the fiscal capacity of the country. Yet little research is being carried out in this area. There should also be a refinement of the data since shabby data could only lead to shabby results. Time series and cross-sectional data of aggregates and their interrelationships could be used, for instance, for the estimation of agricultural production functions and the productivity of resources employed. More trained statisticians,

economists, and research workers can be employed to solve the problem of improper data collection.

4. Taxation in regard to agricultural development is recognised as being important, yet little research is being carried out in this area. More information is needed to devise suitable methods of assessing and taxing land, to deal with the effects of inheritance and estate taxation and the means of improving their effectiveness in reaching land occupancy and use goals. The prime aim of development planning is to encourage investments which either increase productivity in existing industries, and/or effect an expansion of high-yielding industries to which labour is transferred from other low-yielding industries. Success depends not only on the volume of government expenditure but also on the extent to which the Government, by deed or word, stimulates or discourages productive activity.

5. Fragmentation and parcellisation of lands perpetuate low production, inefficient operations, poor land use, and uneconomic units. Small uneconomic holdings do not offer operators enough resources to obtain credit and survive periods of low prices. Thus, operators have a limited range of choices and opportunities which definitely affect their standards of living. There is a dearth of information with respect to the extent fragmentation and

parcellisation of lands contribute to resource inefficiencies, and to the extent consolidation programmes such as cooperatives, group tenure, etc. contribute to increased resource productivities. The cost-benefit calculus of such programmes should also be worked out.

6. Inheritance systems foster land fragmentation and land-use monopoly. Further research is needed in the area of family institutions, which are basic to the social fabric of the Guyanese society, especially in the ownership and transmission of land. Effective remedial measures should take into account the customs and mores of the people so that there could be a wide acceptance of them.
7. Concentration of ownership and control of land impede maximum production, affect equitable distribution of income from land, and obstruct the development of an informed citizenry. More information concerning tax structures to overcome inequitable ownership and control, and costs and sources of funds to effect transfer of ownership, whether on an individual or group basis, is needed.
8. More information is needed about effective media to disseminate information in regard to productive techniques, and the role of institutional innovations in the economic development of Guyana. Media such as extension services, cooperatives, radio, press, and commercial firms should be investigated, since most strategic factors in economic

development rest in a full understanding of the way institutions have developed, in an evaluation of the historical role that these institutions have played, and an analysis of the way these institutions actually work.

9. In the area of occupational immobility and birth control technology, little information is available to the rural population. More nonagricultural employment opportunities would tend to absorb the labour force released from agriculture and thus increase agricultural productivity. This is only possible if the nonagricultural sector expands and a right social climate exists so that the criteria for employment are not based on race, colour, creed, and political persuasion. Such an ameliorative measure could effectively contribute to the economic development of Guyana which needs trained personnel at all levels. Research into the race relations and geopolitics of Guyana is urgently needed. Research is also needed to control the rapid population growth rate which limits the pace of economic development. Man can control his numbers given the right social environment which is free from religious taboos and emotional hysteria. The literature is sparse on the effective implementation of birth control technology and its possible effects on group living in a developing society.

10. Land settlement schemes away from the immediate coastland are sometimes proposed as a remedial measure to population pressures in agriculture. A land settlement scheme, however, is not a panacea to this problem and is not a substitute for a well conceived industrialisation scheme. Land reform can be successful and can contribute to economic development only if it is undertaken jointly with investment programmes in the nonagricultural sectors which may over time provide employment opportunities for the unemployed or disguised unemployed labour force in agriculture. If the economy is to grow over time the surplus labour force in agriculture has to be absorbed by the nonagricultural sectors. Further, research is needed on the extent to which land settlement schemes would be possible, the costs of bringing such lands into cultivation, the benefits which could be expected, and the ways and means of establishing settlers on such lands under equitable and sound tenure arrangements, all of which should be consistent with the goals of economic development.

IX. SUMMARY AND CONCLUSIONS

A. Summary

The central objective of this study has been to analyse the role of agrarian reform in the agricultural development of Guyana through incentives, knowledge, and capital criteria.

The general objective suggested several hypotheses to direct the inquiry. Through delimiting, diagnostic and remedial hypotheses the study attempted to identify the gap between the existential situation and the norm, to appraise failure and success elements in agrarian structures, and to replace failure elements by success elements both actual and potential.

The analysis assumes that land tenure institutions which predominantly characterise the agrarian structures in Guyana can either facilitate or inhibit agricultural development and national economic growth. The absence of incentives, knowledge and capital in the agricultural sector of the country tends to slow the process of development. Without these three criteria the agricultural sector will continue to perpetuate low per capita productivity and low per capita income distribution which are inconsistent with the country's goals of economic development. The analysis focuses on the essential elements of agrarian reform which can facilitate the process of agricultural development and, hence, economic development. These elements are incentives, technological innovations and capital.

The analysis then attempts to answer the following questions:

1. Why do particular land tenure institutions affect adversely or favourably the incentives for cultivators to increase their productivity, given ample capital and knowledge?
2. How do particular land tenure institutions affect adversely or favourably knowledge in the form of technical and managerial innovations in agriculture, given ample capital and incentives?
3. How do particular land tenure institutions affect adversely or favourably the formation of capital and capital use, given the incentives to use capital and the requisite technical and managerial knowledge?

These questions direct the study to analyse the role of agrarian reform in the agricultural development of Guyana through incentives, knowledge and capital criteria. The conceptual model of economic development based primarily on land tenure structures provides the necessary conditions for achieving agricultural development and for testing the efficiency of land tenure structures in terms of their ability to promote the economic and noneconomic goals of agrarian development.

To seek an answer to the first question the study considers several defects and factors affecting land tenure institutions. These are uncertainties arising from conditions of tenure, high fixed costs to operator, occupational immobility, and rewarding

factors proportionately to their marginal value product contributions. The second question involves lower uses of land arising from pattern of ownership, depletion of soil resources, and small holdings. The third question considers high fixed costs of operation and ownership, factor and product markets, and rural marketing and credit institutions. Further, the study briefly states the problematic situations facing the country and emphasises the need for a favourable political and social climate to accelerate agricultural development and national economic development.

In Chapter V the analysis deals with ameliorative alternatives to the problems characterising land tenure structures. These alternatives, it is hoped, can contribute to close the gap between the existential situations and the norms set by and for the country in its Development Programme 1966-1972.

Chapter VI develops a macroeconomic model for financing agrarian reform in Guyana while Chapter VII deals with supplementary measures for effecting agrarian changes. These two chapters complement Chapter V in that they provide remedial alternatives to defects identified in Guyanese agrarian structures. In short, they include the expansion of success elements as catalysts for agricultural and economic development.

B. Conclusions

An analytical framework has been developed to promote agricultural development through agrarian reform in Guyana.

This framework has several advantages within which: (1) different types of agrarian structures may be distinguished, (2) the mutual compatibility and consistency of the objectives of agrarian reform may be analysed, and (3) the causal relationships between agrarian reforms, as means, and predetermined targets, such as agricultural and economic development, may be discerned. The first two steps are essentially methodological and taxonomic. The third step requires theoretical knowledge of the impact of agrarian changes in agricultural and economic development, efficiency, distributive justice or whatever the goals of agrarian reform are, and empirical information on the economic organisation of a developing economy.

Since certain empirical data are lacking, the model cannot be tested. However, it provides a frame of reference to investigate the defects in agrarian structures, the factors affecting agrarian structures, and the relationships between the agrarian means and the ends of agricultural and economic development. Available empirical data aid the analysis, and any conclusions to be drawn are limited to the listed data.

Resource inefficiencies engendered under various forms of tenure arrangements are partly responsible for low per capita productivity and low per capita income distribution in agriculture. To improve this situation so as to promote agricultural development and national economic development will require

fundamental changes in land tenure institutions, in marketing and credit institutions, and in the extension of education and welfare services to the agricultural community. These, in turn, should promote the necessary incentives, technical and managerial innovations, and capital that are so urgently needed in an agricultural economy like Guyana.

Improvement in tenancy arrangements and owner-occupancy would tend to provide the necessary incentives for cultivators to increase productivity. The development of land settlement schemes compatible with the financial capacity of the country could absorb the excess labour force in agriculture and result in greater agricultural productivity. The simultaneous development of cottage industries and the provision of more educational facilities could provide both horizontal and vertical mobility for the agricultural sector and for tackling the problem of rapid population growth. These measures would require heavy investments in both human and nonhuman resources. The will to develop could be a sustaining drive throughout the process of development.

Improvement in marketing and credit institutions could facilitate small farmers, acting in cooperative organisations, to get better prices for their products and obtain credit at rates compatible with productivity rather than with collateral security. In this way, farmers would not be vulnerable to usurious moneylenders and exploitative landlords. Government

sponsored cooperative and credit programmes could be a fillip to the process of agricultural development by channelling domestic savings into productive activities. Excessive 'leakages' of domestic capital abroad could obstruct the development process. Improvement in rural education and health services could contribute to agricultural and economic development by making the rural community more open-minded to innovations designed to increase the efficiency and distribution of agriculture. This is only possible if a favourable political and social climate exists because policies designed to exacerbate rural-urban differences and ethnic animosities could be detrimental to a developing country like Guyana.

Thus, the Guyanese society would have to engage in a certain degree of proportionality so that it could attain a basic minimum of life, liberty, and the pursuit of happiness. This would be consistent with our theme, agricultural development through agrarian reform, postulated in the means-ends continuum.

X. LITERATURE CITED

1. Barlowe, Raleigh. Land reform and economic development. Journal of Farm Economics 35: 173-187. 1953.

2. Binns, Bernard O. Agricultural credit for small farmers. Rome, Italy, F.A.O. of the United Nations. 1952.

3. Binns, Bernard O. Cadastral surveys and records of rights in land. Rome, Italy, F.A.O. of the United Nations. 1953.

4. British Guiana (Guyana) Development Programme (1966-1972). Georgetown, British Guiana, The Government Printery. 1966.

5. Burnham, Linden F. S. The power of cooperative ownership. Speech delivered at the Georgetown Regional Conference of the People's National Congress, Georgetown, Guyana, August 24, 1969.

6. Burnham, Linden F. S. Towards progress and change. Prime Minister's speech in the National Assembly in 1971 Budget Debate, Georgetown, Guyana. December 14, 1970.

7. Commons, John R. Institutional economics. Madison, Wisconsin, University of Wisconsin Press. 1966.

8. Dewey, John. Logic: the theory of inquiry. New York, New York, Henry Holt and Co. 1938.

9. Embassy of Guyana. News release Item XI. Washington, D. C., Embassy of Guyana. February-March 1971.

10. Fitzgerald, Dennis A. Land reform and economic development. Land Economics 27: 385-388. 1951.

11. George, Henry. Our land and land policy. New York, Doubleday and McClure Co. 1901.

12. Giglioli, G. Malaria in British Guiana, Part I. Agricultural Journal of British Guiana 9: 75-81. 1948.

13. Gittinger, James Price. Economic development through agrarian reform. Unpublished Ph.D. thesis. Ames, Iowa, Library, Iowa State University. 1955.

14. Government Information Services. Patterns of Progress 1958-60. Georgetown, British Guiana, B. G. Litographic Company. 1961.

15. Harris, Marshall. Origin of land tenure system in the United States. Ames, Iowa, Iowa State University Press. 1953.

16. Heady, Earl O. Economics of agricultural production and resource use. New York, Prentice-Hall, Inc. 1952.

17. Heady, Earl O. Fundamentals of resource ownership policy. Ames, Iowa, Iowa State University Press. 1963.

18. Hendrix, W. E. Availability of capital and production innovations on low income farms. Journal of Farm Economics 33: 66-74. 1951.

19. Hicks, J. R. Value and capital. 2nd ed. Oxford, England, The Clarendon Press. 1946.

20. Higgins, Benjamin. Economic development. Rev. ed. New York, New York, W. W. Norton and Company, Inc. 1968.

21. Hirschman, Albert O. The strategy of economic development. New Haven, Connecticut, Yale University Press. 1958.

22. Hydraulics Laboratory. Demerara coastal investigation. Delft, The Netherlands, Hydraulics Laboratory. 1962.

23. Jacoby, Eric H. Interrelationship between agrarian reform and agricultural development. Rome, Italy, F.A.O. Publication of the United Nations. 1953.

24. Kundu, A. Inter-industry table for the economy of British Guiana, 1959. Social and Economic Studies 12: 1-42. 1963.

25. Kundu, A. Rice in the British Caribbean Islands and British Guiana, 1950-1975. Social and Economic Studies 13: 243-281. 1964.

26. Leibenstein, Harvey. Economic backwardness and economic growth. New York, New York, John Wiley and Sons, Inc. 1957.

27. Lewis, Arthur W. Theory of economic growth. London, England, George Allen and Unwin, Ltd. 1956.

28. Liversage, V. Land tenure in the colonies. Cambridge, Massachusetts, Cambridge University Press. 1945.

29. Milk, Richard. Agrarian reform and economic progress in Latin America. Unpublished Ph.D. thesis. Ames, Iowa, Library, Iowa State University. 1959.

30. Ministry of Agriculture. Statistics of agriculture in British Guiana. Georgetown, British Guiana, Ministry of Agriculture. 1961.

31. Ministry of Agriculture and Natural Resources. Planning and programming. Georgetown, Guyana, Ministry of Agriculture and Natural Resources. 1970.

32. Ministry of Economic Development. Economic survey of Guyana, 1969. Georgetown, Guyana, Ministry of Economic Development. 1970.

33. Newman, Peter. Problems of cohesion in an immigrant society. London, England, Oxford University Press. 1964.

34. O'Loughlin, Carleen. The rice sector in the economy of British Guiana. Social and Economic Studies 7: 115-143.

35. Owen, Wyn F. The double developmental squeeze on agriculture. Madison, Wisconsin, Land Tenure Center Reprint No. 57. 1967.

36. Parsons, Kenneth H. Institutional aspects of agricultural development policy. Madison, Wisconsin, Land Tenure Center Reprint No. 28. 1966.

37. Pigou, A. C. The economics of welfare. London, England, The Macmillan Co. 1952.

38. Ramsahoye, Fenton H. W. The development of land law in British Guiana. Dobbs Ferry, New York, Oceana Publications. 1966.

39. Raup, Philip M. Agricultural taxation and land tenure reforms in underdeveloped countries. In Conference on Agricultural Taxation and Economic Development. Cambridge, Massachusetts. February, 1954.

40. Smith, Adam. Wealth of nations. London, England, The Macmillan Co. 1950.

41. Smith, Raymond T. British Guiana. Oxford, England, Oxford University Press. 1966.

42. Smith, Raymond T. Land tenure in three Negro villages in British Guiana. Social and Economic Studies 4: 64-82. 1955.

43. Stockdale, Frank, Sir. Development and welfare in the West Indies 1940-42. London, England, His Majesty's Stationery Office. 1943.

44. Thomas, Clive. Sugar economics in a colonial situation. Studies in Exploitation 1: 1-54. 1969.

45. Thorbecke, Erik. The macroeconomic implications of and the cost of financing agrarian reform in Peru. Ames, Iowa, Department of Economics, International Studies in Economics Monograph No. 3. 1966.

46. Thorbecke, Erik, J. Sengupta and K. Fox. The theory of quantitative economic policy with application to economic growth and stabilization. Chicago, Illinois, Rand McNally Co. 1966.

47. Timmons, John F. Agricultural development through modifying land tenure arrangements. In Economic Development of Agriculture. Pp. 81-98. Ames, Iowa, Iowa State University Press. 1965.

48. Timmons, John F. Building a land policy. In John F. Timmons and William G. Murray, eds. Land Problems and Policies. Pp. 275-291. Ames, Iowa, Iowa State University Press. 1950.

49. Timmons, John F. Improving agricultural tenancy. Rome, Italy, F.A.O. Publication of the United Nations. 1959.

50. Timmons, John F. Philosophy and methods of inquiry into land problems. Mimeographed paper. Ames, Iowa, Department of Economics, Iowa State University. 1957.

51. Timmons, John F. and Cormack, J. M. Managing the natural resources and environment through land tenure structures. Iowa Agricultural and Home Economics Experiment Station Journal Paper J-6659. 1964.

52. Tinbergen, Jan. Design of development. Amsterdam, Holland, North-Holland Publishing Co. 1956.

53. United Nations. Demographic yearbook 1967. New York, New York, United Nations. 1968.

54. United Nations. Department of Economic Affairs. Progress in land reform. Rome, Italy, United Nations. 1963.

55. United Nations. Economic survey of Latin America. New York, New York, United Nations. 1969.

56. United Nations. Preliminary report on the world social situation with reference to standards of living. New York, New York, United Nations. 1952.

57. United Nations. Production yearbook 1968. Rome, Italy, United Nations. 1969.

58. United Nations. Statistical yearbook 1967. New York, New York, United Nations. 1968.

59. United Nations. Statistical yearbook 1969. New York, New York, United Nations, 1970.

60. United Nations. Yearbook of national accounts statistics 1968. New York, New York, United Nations. 1969.

61. West India Royal Commission Report. London, England, His Majesty's Stationery Office. 1945.

62. World Land Tenure Problems Conference Proceedings Part III. Madison, Wisconsin, University of Wisconsin. 1951.

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XII. APPENDIX A. TOTAL LAND AND WATER AREA OF BRITISH GUIANA AS GIVEN IN 1952[a]

Total colony area	53,120,000 acres
A. Coastal plain (total area)	3,839,100 acres
Alienated area	
(a) Area occupied by sugar estates	149,400 acres
(b) Area occupied by farms	497,000 acres
(c) Other lands allocated	341,800 acres
Total coastal area allocated	988,200 acres
Unoccupied area	
(a) Meadow and pasture	1,466,600 acres
(b) Forests	1,134,300 acres
(c) Waterways	250,000 acres
Total coastal unoccupied area	2,850,900 acres
B. Forest (total area)	43,979,300 acres
(a) Forest on cultivable land	1,200,000 acres
(b) Forest on silica land	6,500,000 acres
(c) Forest on other soils	32,089,300 acres
Total forests	39,789,300 acres
Waterways	4,190,000 acres
C. Savannah lands (total area)	5,301,600 acres
Occupied savannah	
(a) Rupununi	2,405,500 acres

[a]Source: (30, p. 6).

(b)	Intermediate savannah	36,500 acres
	Total occupied savannah	2,442,000 acres
Unoccupied savannah		
(a)	Rupununi	1,556,100 acres
(b)	Intermediate savannah	1,263,500 acres
	Total unoccupied savannah area	2,819,600 acres
	Waterways	40,000 acres

XIII. APPENDIX B. VITAL STATISTICS FOR BRITISH GUIANA, 1931-1961[a,b]

Period	Population at end of year	Number of registered live births	Number of registered deaths	Natural increase of population
Average 1931-1935	320,816	10,340	7,226	3,114
Average 1936-1940	339,135	10,922	7,199	3,723
Average 1941-1945	364,294	12,525	7,087	5,438
Average 1946-1951	395,018	15,835	5,560	10,275
Average 1952-1956	460,692	19,737	5,644	14,113
Average 1957-1961	535,438	23,056	5,297	17,759

[a] Source: (33, p. 35).

[b] Data for 1931-1945 includes the registered Amerindian population (about 8,000-16,000 during this period) while post-war data do not.

Crude birth rate per 1,000 population	Crude death rate per 1,000 population	Rate of natural increase per 1,000	Infant mortality rate per 1,000 live births
32.2	22.5	9.7	141
32.2	21.2	11.0	119
34.4	19.4	15.0	112
40.5	14.3	26.2	81
43.5	12.5	31.0	75
43.5	10.0	33.5	60

XIV. APPENDIX C. IMPORTS OF SOME SELECTED AGRICULTURAL COMMODITIES WHICH CAN BE PRODUCED IN GUYANA OR FOR WHICH SUBSTITUTES CAN BE HAD, 1966 TO 1969[a]

Commodities	Unit	1966	1967 Revised	1968 Revised	1969
Onions	lb.	4,951,420	5,248,746	5,277,359	5,489,380
	$	488,992	576,051	602,512	670,864
Carrots	lb.	146,886	138,243	23,403	81,453
	$	33,661	38,734	7,887	26,171
Peanuts	lb.	908,768	1,191,592	1,052,026	973,746
	$	294,993	278,317	324,400	350,570
Cabbages	lb.	405,716	154,659	n.a.	292,500
	$	83,624	26,959	n.a.	61,608
Orange juice	Glns.	391,192	186,212	205,671	106,048
	$	535,305	442,059	491,419	274,701
Tomatoes	lb.	20,378	13,760	28,050	1,020
	$	4,002	2,907	11,566	321
Black pepper	lb.	81,522	54,608	62,058	83,700
	$	60,896	33,347	40,043	52,985
Ginger	lb.	91,726	52,024	53,439	12,518
	$	46,544	25,899	30,364	8,125
Tapioca	lb.	163,866	216,108	304,019	321,283
	$	24,708	34,254	54,509	58,198
Cocoa powder	lb.	214,206	192,121	150,401	148,067
	$	196,761	180,509	123,673	149,541
Turmeric	lb.	108,345	36,792	27,038	26,877
	$	34,832	10,932	10,562	17,999
Tomato paste	lb.	753,250	1,020,492	542,037	512,299
	$	251,414	292,138	172,324	184,323
Castor oil	lb.	35,594	22,559	33,741	36,743
	$	12,448	9,420	18,049	19,553

[a]Source: (31, p. 28).

Commodities	Unit	1966	1967 Revised	1968 Revised	1969
Blackeye peas	lb.	332,545	15,000	108,500	157,500
	$	65,964	2,721	31,336	35,042
Split peas	lb.	4,673,286	6,695,647	6,938,348	7,302,018
	$	627,407	944,083	1,101,934	1,131,344
Other peas and beans	lb.	2,326,858	160,211	423,696	269,763
	$	320,743	41,467	103,713	78,361
Poultry (killed or dressed)	lb.	30,001	48,071	33,891	31,893
	$	27,688	38,839	39,462	31,885
Corn (maize) (Unmilled)	lb.	5,253,981	4,948,920	5,843,105	10,445,952
	$	446,048	480,529	501,839	810,031