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AN ASSESSMENT OF THE BUDGET AS
AN INSTRUMENT FOR DEVELOPMENT IN GHANA

presented by

Francis Enu-Kwesi

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of the requirements for

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Major professor

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AN ASSESSMENT OF THE BUDGET AS
AN INSTRUMENT FOR DEVELOPMENT IN GHANA

By

Francis Enu-Kwesi

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Resource Development

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ABSTRACT

AN ASSESSMENT OF THE BUDGET AS AN
INSTRUMENT FOR DEVELOPMENT IN GHANA

By

Francis Enu-Kwesi

The introductory chapter of this paper deals with the historical development of Ghana's problems after independence. The three major problems were noted to be Balance of Payments, Unemployment and Inflation. To deal with these problems four alternatives were suggested namely Direct Foreign Investment, Trade, Aid, and Budgeting.

Budgeting was chosen to be the focus of this study because it was thought to be the least dependent on external influences. The budget has been used by the governments of Ghana to play an activist role in development by building infrastructure as well as engaging in directly productive activities, and also as an avenue for the establishment of monetary and fiscal policies. The development budget was selected as the area of focus with emphasis on the selection of projects for inclusion in the budget. I hypothesized that the project analyses that are undertaken for projects included in the development budget are not done with appropriate prices because they do not account for the distortions in the economy.

In an attempt to present a better way of undertaking the analysis I chose as a typical example the Upper Region

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Agricultural Development Project and used the net present value method to reformulate the benefit-cost analysis. By using the shadow exchange rate and a more meaningful discount rate the project in its original design was unprofitable due mainly to four farm models that had combined losses that outweighed profits from the other eight models. An alternative design that eliminated the unprofitable models proved to be profitable after twenty years.

Chapter one is the introduction, chapter two deals with the budget, chapter three deals with the data. Chapter four deals with issues concerning shadow prices, notably exchange rates, discount rate and other influences on input and output prices. Chapter five contains the analysis and results. Chapter six deals with other factors that affect the budget in its role as an instrument for development - such factors including resource scarcity and power. The concluding chapter is essentially a summary of the first six chapters.

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CHAPTER ONE

INTRODUCTION

1.1 STATEMENT OF THE PROBLEM

Ghana is in West Africa ana is bordered in the north, west and east by the Republics of Burkina Fasso, Ivory Coast and Togo respectively and in the south by the Gulf of Guinea.

It attained independence from Britain in March 1957 with relatively substantial foreign reserves and a relatively well managed economy. At that time the population was well under 6 million people. The country had a lot of potential but as will be evident in ensuing pages this potential was never realized. A number of development plans have been drawn since independence, all aimed at co-ordinating or harmonizing activities for the development of its resources for growth and development purposes. All of these plans have either not been adequately implemented due to technical, capital and management problems or have been abandoned due to sudden changes in governments and their political and economic orientations. The last of these plans was drawn up in 1975 to cover the period from 1975 to 1980 and also to serve as the foundation for the decade of the 1980s and beyond.

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Ghana's economy is agricultural and rural oriented. Agriculture accounts for about 53% of the gross domestic product, provides employment for an estimated 53% of the labor force and accounts annually for about 70% of total export earnings. Cocoa, the single most important export crop has a dominant influence on production, employment, foreign exchange and government revenues. About 3.0 million acres of land are currently under cocoa cultivation, and about 40% of the total agricultural labor force is employed, while earning about 60% of all export earnings. The cocoa industry has however, been declining over the years due to inadequate incentives and low administered prices paid by the state owned cocoa marketing board to the farmers. Ghana is no longer the world's leading producer of cocoa. The contribution of the crop to Gross Domestic Product has fallen from 11% in the 1960s to 8% and the Ghanaian share of world output declined over the same period from 31% to 21%.[1]

Until the mid 1970s when commercial farming of grains became significant, farming was largely the preserve of small scale peasant farmers. Much peasant farming was traditional and for subsistence so that no more than 50% of agricultural output entered the distribution system. Although agricultural extension services have been in

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[1]These figures referred to in this paragraph are in Chapter I, beginning page 1 of the Five Year Development Plan 1975/76 - 1979/80. The percentages have been revised by referring to recent issues of the World Development Report starting from Table 1 Basic Indicators.

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existence since the colonial days the impact of modern farming practices is still limited, and credit facilities as well as modern inputs are not available to the majority of peasant farmers.

In contrast to agriculture, industry is relatively modern although it is still dominated by simple technologies in the manufacture of things such as nails, shoes, utensils, canned edibles. Others involve the processing of imported materials into finished goods for domestic uses, notably milk, cement, and non alcoholic beverages. All these enterprises have suffered in recent times due to the non-availability of foreign exchange for the importation of raw materials. There is chronic under utilization of capacity; in some cases there have been complete shut downs of enterprises because not only are such enterprises dependent on foreign sources of raw materials but they also depend on foreign exchange for importation of parts to maintain their machinery, and also rely on foreign technicians to service such machinery. Such foreign technicians have to be paid heavily just to attract them into the country and their turnover rate is very high.

One need not conduct an extensive analysis of the Ghanaian economy to know that the basic problems are balance of payments, unemployment and under-employment of resources, and inflation.

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1.1.1 Balance of Payments:

About the most influential constraint on the economy is the availability of foreign exchange. In an open economy such as Ghana's, we can denote the national income identity as $Y = C + I + G + NX$, where Y is national income (output), C is private consumption, I is investment, G is government spending and NX is net exports or exports minus imports. The low level of tax revenues and saving and excessive government spending (as examplified in the budget deficits of the 1970s and early 1980s) were not matched by improvements in domestic output and exports. The consequence was that imports had to be increased to offset the shortfalls in domestic output resulting in negative net exports and balance of payment problems.

The ability to import depends on export earnings and foreign borrowing. The dependence on only a few primary exports like cocoa, timber and minerals subjects the amount of export earnings to wide fluctuations. Manufacturing makes little contribution to export earnings; manufactured exports are mainly processed cocoa (cocoa paste and cocoa butter) and wood products. The external orientation of the economy has resulted in the establishment of factories that depend to a large extent on external sources for their material inputs, and an agricultural sector that produces goods for exports or for domestic consumption in unprocessed form. The industrialization efforts of the post-independence era failed to base the establishment of

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manufacturing enterprises on the processing of local resources and produce from the agricultural sector. This lack of linkage between agriculture and industry has contributed to balance of payments problems due to reasons suggested earlier on.

The slow growtn of export volume and declining relative prices have reduced export purchasing power. At the same time due to the decrease in agricultural productivity there are recurring food shortages as well as shortages of other essential items like drugs, books and spare parts which have to be imported to alleviate those shortages. The end result is a negative trade balance. In addition the country relies to a large extent on imported technicians. These together lead to balance of payments problems. Even though there is an official policy of diversifying the country's export structure, the extreme dependence on cocoa has not diminished over the years. Between 1970 and 1980 capital inflows declined. Private capital was not available due to continued political uncertainties, commercial lending was not feasible due to the accumulation of large arrears and lack of credit worthiness while official aid was reduced due to lack of action on macroeconomic policy adjustments.

In Table 1.1 the balance of payments for selected years during 1970-1981 is shown. The current account balancce for

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Source:

Table 1.1:   Summary of Balance of Payments, 1970-81
(selected years)   (million US $)

	1970	1975	1978	1979	1980	1981
Export of Goods & NFS	472.4	891.1	996.0	1177.4	1315.9	802.9
Imports of Goods & NFS	502.6	881.5	1072.8	1096.0	1313.0	985.8
Resource Balance	-30.2	9.6	-76.8	81.4	2.9	-182.9
Factor Services	-44.5	-36.3	-27.6	-39.0	-66.3	-62.7
Net Transfers	7.0	44.6	58.3	79.4	79.7	82.9
Current Account Balance	-67.7	17.9	-46.7	121.8	16.0	-162.7
Capital Account (net)	n.a	68.8	116.2	97.7	209.5	-85.1
Net Government Borrowing	n.a	23.7	114.4	100.7	189.7	58.8
Direct Private Investment	67.8	45.1	1.8	-3.0	19.8	26.3
Errors and Ommissions	16.6	37.3	-145.6	-108.0	-158.6	-197.6
SDR Allocation	-	-	-	14.2	14.3	12.7
Overall Balance	-	124.0	-75.5	125.7	-81.2	-262.5

Source: IMF. p_p 7 of Ghana: Policies and Program for
Adjustment.   A world Bank Country Study, 1984.

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the first half of the period does not show any strains except for 1970. Problems emerged in 1976 with the current account deficit persisting until 1981 except for 1979 where a positive balance was recorded due to a stabilization program. These deficits were modest, never exceeding 2% of the Gross Domestic Product.

As regards the performance of the export sector a comparison of the relative growth rates of Ghana's exports with those for sub-Saharan Africa during the 1960's and 1970's is presented in Table 1.2 below. The trend since 1981 is not available.

The Table 1.2 shows that the growth in Ghana's export volumes was much lower than the SSA as a group during the 1970's and also lower than its own performance in the 1960's.

1.1.2 Unemployment of Resources:

Resource use and output has been declining since the 1970's. Most of the basic commodities are hard to come by. A number of factors contributed to this decline in output. The official policy of price control served as a strong disincentive for production and export. This policy led to a continuous decline in the real value of producer prices which coupled with the shortage of consumer goods in rural areas contributed to the smuggling of foodstuffs and cocoa to neighboring countries where consumer and other goods were

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Cocoa

Timber

Bauxite

Gold

Source:

Table 1.2:   Average Annual growth of Exports (%)

	Volume				Price	
	Sub-Saharan Africa		Ghana			
	1960-70	1970-80	1960-70	1970-80	1960-70	1970-80
Cocoa	-0.8	-1.4	-3.6	-6.2	5.4	14.2
Timber	4.4	-0.5	6.7	-14.1	1.0	0.4
Bauxite	12.5	25.0	-	-4.3	5.6	2.2
Gold	2.3	-4.2	-2.4	-7.1	-	32.8

Source: (1) Africa Strategy Report
          (2) World Bank Staff Estimates

          Published in Ghana: Policies and Programs for
          Adjustment, 1984, p_p 10.

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available. As already discussed in the previous section there was a decline in imports due partly to dwindling foreign exchange and negligible capital flows. This led to severe shortages of raw materials, spare parts, investment and consumer goods in the country. Infrastructure and social services have been decaying due to the lack of maintenance The energy crisis of the 1970's did not do much to help since Ghana is an oil importing country. Energy conservation efforts have not worked or have worked to the detriment of increased productivity. It has affected transportation of agricultural products from the farming areas (rural areas) to the urban market centers. Foodstuffs and other items subsequently go to waste on the farms. To avert losses some farmers have shifted to subsistence farming while those along the borders find it lucrative to sell the excess of their produce, necessary for their subsistence, in neighboring countries notwithstanding the ban on the export of food. Energy policies have not been integrated into the larger objective of development. Apart from the effect it has had on foodstuffs production, it has also affected the fishing industry which depends on petrol and other petroleum products to power the outboard motors, trawlers, and for the refrigeration of fish.

When compared with many African countries, Ghana had, originally, a large reservoir of skilled and trained manpower. In recent years there has been a tremendous exodus of teachers, doctors and other professional workers

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to countries where salaries and living conditions are better. This outflow of managerial, professional, and technical talent has eroded the administrative base of the public sector. The absence of skilled personnel to manage the resources has led to a situation where existing capacity is underutilized or even unutilized. There is too much idle capacity which is also attributable to the dependence on imported inputs. Due to the disparities in amenities between the rural and urban areas there is a high inflow of people to the urban areas from the rural areas. This exerts pressure on services in these urban centers. At the same time, available jobs are not numerous enough to meet the needs of a growing urban population. However, such migration deprives the rural areas of agricultural labor leading to low productivity since agriculture is still labor-intensive in Ghana. Such labor shortages become severe particularly in the cocoa sector in the forest belt, and on grain farms in the savanna belts (Northern and Upper Regions) during the peak labor demand periods (harvest time).

1.1.3 Inflation:

Since the mid 1950s the economy has been plagued by persistent and growing budget deficits. In the mid 1970s there was steady erosion of government savings, a consequence of rapidly increasing current expenditures, relatively stagnant revenues and the continued subsidization

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of inefficient state owned corporations. To understand the problem of inflation in Ghana it is necessary to digress a little and talk about some of the economic conditions in the country. Real Gross National Product declined by about 11 percent between 1960 and 1969, and in the 1970s it declined by 2 percent per annum. The per capita gross domestic product declined by about 3.4 percent annually. The gross domestic product savings rate was well below 3 percent per year. In short, the economy was declining steadily in the 1970s and early 1980s.

According to Tony Killick (1973), inflation in the 1970s averaged between 70 and 100 percent per annum. In 1979 inflation was computed at 116 percent. Food prices shot up astronomically, while consumer prices rose by almost 200 percent. It was estimated that domestic prices increased by a factor of 14 as compared with export prices which rose by a factor of 2.5. These price increases affected expenditures in all aspects of the economy. Between 1973 and 1978 the annual budget deficits fluctuated between 21 and 57 percent, with this deficit exceeding C 2 billion by 1978-1979 (C is the sign for the Ghanaian monetary unit known as the cedi). At the same time central government expenditures increased by about 43% annually (from C 738 million in 1973 to C 4,390 million in 1978). Civil service outlays alone amounted to about C 450 million

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a year not counting items of expenditures like operating allowance, fringe benefits, and other accompanying costs. To be able to pay for all these expenses the money supply was increased. Between 1965 and 1969 the money supply rose by only 2 percent annually. In the era of the second republic (1969-1972) the annual increment in the money supply was about 7.5 percent. This jumped to 80 percent per annum under the National Redemption Council (NRC) and Supreme Military Council (SMC) or by 675 percent over the period of military rule (1972-1979). While these increases were occurring with the money supply, the formal rate of exchange between the Ghanaian cedi (local money) and foreign currencies was so unrealistic that it had no effect on and was not affected by the actual state of the economy. The black market rate of exchange was about 8 times the formal or official rate.

With declining output levels in all sectors of the economy, an ever increasing population, rising government expenditures with its effects on money supply, and a heavily distorted and ineffective exchange rate system it was no wonder that the inflation rate was so high. It is worth emphasizing that in the midst of the economic disarray various analysts came up with different ways of computing the rate of inflation. The variations in the methods do not matter as much as the effects of the numbers generated. In

Table 1.

Period

1965-19

1973-19

Source:

Table 1.3:   Inflation in Ghana

Period	Average Annual Rate of Inflation (%)
1965-1973	8.1
1973-1983	51.6

Source: World Development Reports 1985 and 1986
           (Basic Indicators)

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this regard a short table is being presented below to throw
light upon the situation in Ghana between 1965 and 1983.
These figures summarized from World Development Reports for
1985 and 1986 show that inflation averaged 8.1% annually
between 1965-1973 and rose to 51.6% per annum for the next
decade.

1.2 ALTERNATIVE COURSES OF ACTION

While it is not easy to clearly define or even specify
the number of alternatives open to the decision-making
bodies, it is clear enough that some of the choices may be
politically feasible but economically unworkable or vice
versa. In the case of Ghana we may limit ourselves to the
following four alternatives based on past experiences:

1. Direct foreign investment

2. Trade

3. Aid (borrowing)

4. Budgeting

The policy makers recognize that perhaps the most
important constraint hindering growth and development of the
domestic economy is that of foreign exchange. This
constraint can be eased by; (a) direct foreign investment,
(b) engaging in trade or (c) borrowing from foreign sources.

The existing structure of the economy tends to generate
trade-offs between economic growth and worsening balance of
payments problems. This is demonstrated by the fact that
since independence serious balance of payments problems (see

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Table 1.1) have hindered economic growth and resulted in political instability. Many succeeding governments have from their inception vowed not to borrow from foreign sources for activities that are not capable of improving the balance of payments position so as to help repay the debt. Unfortunately, none of these governments has been able to stick to their vows. All of these governments ultimately have resorted to foreign borrowing to finance mostly non-productive activities. Furthermore the high rate of inflation has so eroded purchasing power that many workers completely exhaust their incomes by the end of the second week of each month. Consequently, savings are either non-existent or negligible. In fact Ghana has one of the lowest domestic savings rate in sub-Saharan Africa. It is estimated that the ratio of growth in domestic savings to gross domestic product in recent years has been very low as compared to the levels in the early 1970s.

The savings problem in addition to problems encountered in borrowing and in attracting direct foreign investment have all contributed to low investment and the consequent effect on output, employment and inflation. The current rate of domestic investment has as a result equalled the low rate of domestic savings since the net foreign savings have almost been negligible. To highlight the savings problem and its effect on investment Table 1.4 is presented.

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(est)

Source:

Table 1.4:   Investment and Saving
             (amounts are in millions of cedis)

	Financing of Investment			As % of GDP	
	Gross Domestic	National Savings	Foreign Savings	Domestic Investment	National Savings
1970	320	305	15	14.2	13.5
1975	673	681	-8	12.7	12.9
1980	2368	2053	315	5.7	5.0
1982 (est)	1148	1198	50	1.3	1.4

Source: Ghana: Policies and Program for Adjustment.
          A World Bank Country Study, April 1984, p. 19.

The large absolute changes in gross domestic investment
and national savings between the years 1975 and 1980 are due
to changes in the exchange rate. The exchange rate issue
will be discussed in Chapter IV. The table shows that both
gross domestic investment as well as national savings have
declined relative to the gross domestic product over the
last decade. The 1982 estimates, for instance, show that
almost all of the domestic product was consumed with very
little savings and consequently very little capital
formation. This scenario is a result of several factors.
There has been a relative expansion in the public sector's
asset ownership with a corresponding reduction in the income
of the private sector. Given the inefficiencies in the
public sector, profits declined leading to a fall in the
average and marginal savings rate. Furthermore, because of
the unfavorable investment climate due to high tax rates,
undue governmental interference in the market and political
instability, the private sector had little or no incentive
to generate any savings for investment purposes. Also the
high rates of inflation discouraged savings and led to
speculation and investment in commodities, real estate and
other tangibles.

Direct foreign investment is limited by the risks.
Frequent nationalizations, restrictions on profit
repatriation and the lack of needed infrastructure are the
usual constraints. If the governments can insure
international investment perhaps many foreign investors may

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be encouraged. Unfortunately, the governments themselves
are not stable, and succeeding governments tend to override
provisions of contracts that were initiated by ousted
governments. Ghana has not been very effective in absorbing
and servicing foreign capital, restrictions have been placed
on private direct investment with some sectors of the
economy reserved only for Ghanaians even if they lack the
resources necessary for investment in these sectors. Most
of the successive governments have also complained that most
foreign investments are unnecessarily subsidized or are
means of exploitation and represent another form of
neocolonialism. While it is true that some of these
investments may not ultimately serve the national interest
it is nevertheless very important that caution be exercised
in differentiating between the exploiters and the genuine
investors. The stereotyping of all foreign investors as
exploiters could lead to undermining of the economy
especially by the powerful multinationals. In exercising
restraint on the misperception of foreign investment, we as
Ghanaians must encourage foreign investment that is
consistent with the country's development objectives. Most
governments have also emphasized the development of
infrastructure as a means by which the country can exploit
and utilize her resources. However, since infrastructural
projects have long gestation periods, direct foreign
investment has not been forthcoming in those sectors and as
a consequence most of the development infrastructure has

been financed with World Bank or IMF loans which sometimes are attached with conditions unacceptable by the citizenry.

Growth depends partly on the country's ability to generate savings and on how efficiently it invests and manages the new capital in addition to its ability to promote exports and save on imports. Ghana has not been able to do any of the above. Ghana is vulnerable to terms of trade shocks which have over the years raised the amount of domestic production needed to pay for a given quantity of imports thus leaving less for domestic saving. The growth rate of the economy has been negative while the population growth rate has been increasing. Per capita income has been falling and with it the ability to maintain earlier saving rates. There has been tremendous amounts of money spent on subsidizing consumer goods. These amounts plus the losses of the inefficient state enterprises have been a significant drain on public savings. The existing stock of capital has not been judiciously used. Coup d'etat after coup d'etat has led to erosion of the capital base. Many projects have been abandoned due simply to changes in political orientation by succeeding governments. Those projects not abandoned have not been maintained and depreciation of existing machinery has rendered such projects inoperable. Return on investment has therefore been low or negative.

Given the above problems it is not surprising that exports have not increased at expected rates. The slow growth of exports has made it almost impossible to finance

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gross domestic product (GDP) growth especially when the bulk of these low export earnings goes into servicing the country's external debt and financing the importation of energy resources. The doctrine of self sufficiency preached by military leaders and often confused with isolationism has led to protectionist policies which, while breeding inefficiencies, have also hindered the growth of exports. Also the inability to raise exports has affected the ability to import. In Table 1.5 below the decline in the export volume is reflected in the decline in the export-GDP ratio from a high of 20.7 in 1970 to 3.6 in 1981. The effect of this decline on imports is also reflected in a decrease in the imports - GDP ratio from 18.5 in 1970 to 3.6 in 1981. The balance of payments problems discussed earlier on can also be deduced from the decline in the ratio of exports to imports over the years. These performances can be attributed to the fact that Ghana experienced the steepest decline in cocoa and gold production (the major exports) at a time when world prices for these commodities were very high, and thus did not benefit from a potentially vast inflow of foreign exchange earnings. The decline in domestic production is not the only reason for the low growth in exports. Diversion of exports or smuggling to neighboring countries with more favorable prices also contributed to the slow growth in official exports. On the whole Ghana performed rather badly when compared with other

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Source

Table 1.5:   Foreign Trade Indicators.

	1970	1975	1978	1979	1980	1981
Exports GDP Ratio	20.7	17.6	8.2	10.9	8.5	3.6
Imports GDP Ratio	18.5	17.2	7.7	9.2	7.8	3.6
Ratio of Exports to Imports	1.12	1.02	1.07	1.19	1.08	1.0
Exports as % of World Imports	0.15	0.10	0.07	0.07	0.06	0.05
Exports Quantum Index (1970 = 100)	103	100	59	52	54	49

Source: Ghana: Policies and Program for Adjustment.
A World Bank Country Study.   1984.   p. 8.

countries of sub-Saharan Africa (as already shown in Table 1.2). It was seen that while neither side performed well, Ghana's performance was worse than her neighbors.

It is also evident that while prices of Ghana's major export items increased over the period 1960-1980 the country experienced very significant declines in the volume of exports. Ghana's poor performance can be attributed to inadequate domestic prices as compared to neighboring countries, inefficiencies in the productive systems and in the case of cocoa, a shift in the domestic terms of trade. It was more profitable for farmers to produce crops like maize, cassava and plantains which had short gestation periods and commanded relatively higher prices. There was also excessive taxation of exports which was a disincentive to producers. The continued intervention of the state in the input supply and output marketing through establishment of marketing and development boards and institutionalized price controls all hindered private initiatives.

In this chapter I have enumerated some of the major problems facing the country and attempted a discussion of some solutions. The foregoing discussion, however, brings into focus the difficulties that face the country in the quest for solutions. Direct foreign investment, trade, and aid are not very likely to be of much help in the short-term for the reasons cited. However, there is one avenue or instrument that can be used to correct some of these problems in order to enhance direct foreign investment,

trade and aid. This instrument is the budget and it will be discussed in the next chapter. The focus will be on the development budget with emphasis on projects and programs. This work will focus on the Upper Region Agricultural Development Project as a case study concerning the selection and analysis of projects for inclusion in the development budget. It is my contention that the project analysis, that is undertaken for any of these projects, has not been completed with accurate prices. The objective of this study then is to repeat the cost benefit analysis using the Net Present Worth method with recalculated prices for the inputs and outputs. Results obtained from this analysis will help to determine the net worth of the project and will also show that the incorrect prices used in the official analysis overestimated the net worth of the project and prevented contingency measures from being initiated to counter any shortfalls in the expected impacts of the project.

CHAPTER TWO

FOCUS OF STUDY

2.1 THE BUDGET

In the introduction I discussed problems facing the country and some means available for rectifying these problems. Based on Ghana's circumstances it was concluded that in the short run trade, aid, and direct foreign investment will not be very useful as corrective means because of the immense external influences involved. The budget is the only instrument which is largely within domestic control given the resources available. It has been the means through which funds are channeled to the various development projects. It has been used to manage or mismanage the economy as the case may be. the various governments have used the budget to play an activist role in development by building infrastructure as well as engaging in directly productive activities. The budget also determines the environment in which the private sector operates.

Premchand (1983) discusses budgeting and how it involves different tasks on the expenditure and revenue sides. On the expenditure front, it involves the determination of the total size of the budget, size of the

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outlays on different functions and the magnitude of outlays on various programs that are part of the function. On the receipts side, the size of the overall revenues and foreign aid, where applicable, needs to be decided. A decision is also needed on the size of the deficit components of its financing and the likely ownership of public debt. The main objectives of the budget in Ghana, as outlined in the 1975-1980 development plan (p. 5-10) have not changed over the years. These objectives are basically three fold:

(i) establishment of a stable macroeconomic environment by adopting sustainable monetary, fiscal and foreign exchange policies.

(ii) establishment of a system of incentives that encourages resources to be allocated efficiently and used optimally.

(iii) establishment of a pattern of growth and development whereby benefits are more fairly distributed.

Discussion of the above objectives can be facilitated by an examination of a three fold framework as outlined by Premchand.

1. Economic Policies

    a. Income, employment and inflation goals

    b. Exchange rate policies

    c. Monetary policies

    d. Fiscal policy

        1. Resource Mobilization

        2. Rate of Expenditure growth

      3. Investment expenditures

      4. Subsidies

      5. Budget deficit

2. Institutional

   a. Consultation and coordination among levels of government

   b. Coordination within government

   c. Organizational rigidities

   d. Noneconomic considerations urged by political elements

   e. Administrative capability

3. Budgeting

   a. Approaches to revenue and expenditure estimation

   b. Flexibility in fiscal action

      1. Levels of expenditure already committed

      2. Facility in the levy of new or revision of existing taxes and rates

   c. Constraints of the budgetary process

      1. Time

      2. Information: approaches of financial control; inadequate funding

   d. Financial management

      1. Timing of release of funds

      2. Adherence to projected costs

      3. Flexibility in the utilization of funds

   e. Personnel constraints

The importance of the above factors to Ghana's situation will become obvious as this essay progresses. For

now, it is sufficient to say that macroeconomic policies are critical because of their effect on (i) price stability, (ii) the allocation of resources, (iii) balance of payments, and (iv) other conditions necessary for growth and development. Essentially, the budget that is used in Ghana outlines short term, usually yearly macroeconomic policies that are generally within the framework of policies outlined in longer term development plans. The critical issue is therefore the effective management of the economy through the budget in order to achieve long-term growth and development. There is so much widespread poverty and negative economic growth that all succeeding governments have stated the same objectives of promoting development to eradicate the ills of society, albeit through different socio-politico-economic means.

It is not only in Ghana that one finds these objectives. Many of the developing countries of the world regularly draw up development plans and use the budget to meet the objectives specified in these plans on an annual basis. Every economy in the aggregate involves the utilization of resources - human, money and materials - to produce end products which also go to satisfy the people. For those countries that depend to a great extent on development planning the budget becomes a tool for the management of the economy. Given the problems of Ghana and most developing countries, notably problems of inflation and unemployment, the budget can be used to play an important

role in ameliorating these problems. For instance, since
taxes affect the level of private income, the distribution
of that income and the volume of private expenditures, the
governments tax policies as outlined yearly in the budget
statements should be coordinated with the other facets of
the economy because if these policies become disorganized it
could lead to chaotic conditions. That is not surprising in
the case of Ghana since a mixture of uncoordinated policies
have left the country groping for survival. High taxes are
disincentive to work, and also affect the capacity to save
and invest. Taxation on new investment can hamper the
expansion of existing enterprises. Taxation can be used to
affect the price level as well as relative prices and
varieties of economic activity.

Apart from the effect on taxation policies, budgetary
policy can also serve to restrain unnecessary government
expenditure and stimulate efficiency in government. This
assumes a well ordered system of checks and balances.
Public expenditures in most Third World countries are a
substitute for private expenditures and it is generally true
worldwide that such public expenditures usually displace
private consumption. Whereas government outlays are
desirable in sectors where the private sector is incapable
or unwilling to participate, wholesale participation of the
government in the economy of Ghana has brought along with it
oversize work forces, corruption, nepotism, inefficiencies
and corresponding losses in revenue. One would envisage

that given the country's high levels of inflation and unemployment and low levels of productivity, the budget would be used not to further overheat the economy but to channel investment resources, both public and private, to appropriate areas through formulation of judicious tax policies.

T. A. Akinyele (1975) discussed that Nigeria used the budget as a management tool for the economy especially during the civil war (1966-1970). By a deliberate and conscious use of budgetary measures, taxes on personal and corporate income and on imports and exports were increased while at the same time expenditure rationalization measures restricted non-military expenditures and reduced financial assistance to non-profit yielding corporations. Earnings were standardized in order to restrain expenditure on administration. Voluntary and compulsory saving schemes were also introduced to mop up floating liquid assets and to assist in the financing of the war. He concluded that the success achieved in financing the war demonstrated the need to appreciate the role of the budget as an instrument of economic stimulation and control.

Another example of the usefulness of the budget in times of economic crisis occurred in Zambia although the country's problems are far from over. According to Curry (1980), Zambia has been experiencing economic crisis since independence and especially when world demand for copper, its main export, has stagnated. As an answer to the

problems it was decided that the country needed major
changes in its basic strategy of economic and social
development. Consequently, the 1976 budget proposed cuts of
unparalleled severity in both capital and recurrent
expenditures together with major reductions in food and
agricultural subsidies which brought marked increases in the
cost of living. It was noted by Curry that these changes
had been necessitated by external forces, notably the
decline in world copper prices and the sharp fall in the
volume of copper exports. Since copper could not be relied
upon as the country's main stay, the 1977 budget emphasized
a strategy of self-reliance five years after Ghana's
military rulers had emphasized the same strategy in 1972.
Some of the proposals introduced in Zambia's 1977 budget
included efforts directed toward general economic
diversification and development of agricultural capacities.
It was emphasized that peasant farmers be assisted through
loans, extension services and marketing facilities. Some of
the specific proposals put forward by the finance minister
were (a) encouragement of commercial farming, (b) promotion
of local processing through labor-intensive methods within
small scale enterprises, (c) gearing the economy toward both
import-substitution, and (d) giving exporters concessions so
that the export sector is expanded and diversified. To
further highlight the importance of the budget in Zambia,
the private sector was to be encouraged, and foreign private
investment recognized within the bounds of the policies

enunciated in the party's manifesto. Other measures similar to the three objectives of the budget in Ghana were outlined.

J. C. Doh (1976) emphasized that budgeting is the focal point for control over resources in most third world countries. It is also the focal point of many aspirations, such as economic growth, increased employment opportunities and improved standard of living for the masses. In a modern context, budgeting and the financial policies embodied in the budget of a country, whether they relate to revenue measures or expenditure policy, have implications for all. It is recognized that the budget has distributive and redistributive effects and must therefore respond to the needs of the mass of the population, especially the poor. Doh contends that while budgeting may in the technical sense be regarded as value-neutral, his conceptual framework takes into consideration the effects that a budget has on the poor. For this reason the budget cannot afford to be neutral. He suggests an interdisciplinary approach to budgeting, which should take into consideration the forces and factors that shape the composition of expenditure. These factors include:

1. Environmental factors

   (a) Geography (including climate and location)

   (b) History

   (c) constitutional framework (including legal

      institutions)

2. Demographic and technological factors

    (a) population growth and age structure (demographic)

    (b) population density and distribution, especially urbanization (demographic)

    (c) production and consumption technology (technological)

3. Economic factors

    (a) growth of national income

    (b) distribution of income (including regional distribution)

    (c) level and rate of growth of per capita income

    (d) rate of price change

    (e) productivity changes

4. Political factors

    (a) ideology

    (b) character of political institutions

    (c) tax intolerance

    (d) occurrence of crises

    (e) attitudes to centralization

5. Administrative factors

    (a) nature of the budgetary process

    (b) nature of bureaucracy

    (c) habit

The integrated approach to budgeting as conceptualized by Doh implies that problems do not recognize the disciplinary boundary of knowledge. The problems of developing countries cannot be dichotomized simply as economic, or political, or historical or geographical.

Third world problems overlap disciplinary boundaries so it is important to consider social, political and other variables in addition to the criterion of economic efficiency.

In Nepal as in many other developing countries the importance of the budget cannot be overemphasized. However, the budget's effectiveness has been brought into question. John C. Beyer (1973) unlike Doh discussed the importance of transforming the traditional budgeting systems of developing countries into more effective instruments for the allocation of public sector resources. He concentrated on the innovations that Nepal attempted to introduce in its budgeting system between 1968 and 1972. He noted that the budgeting systems of developing countries are dominated by the traditional objectives of control and accountability rather than a concern for allocating limited public sector resources to well defined programs and projects that are intended to serve a set of national objectives. The deficiencies of the traditional budget thus limit its allocative function. There is

(a) too much emphasis on items of expenditure to ensure financial control

(b) concern for avoiding expenditure

(c) absence of a budget structure that clearly identifies programs and projects

(d) failure to specify objectives

(e) division of the budget into separate components, usually recurrent and development budgets

(f) repetitive scrutinization of decisions in the process of releasing funds (scrutinization at every level of the hierarchy)

(g) lack of analysis and evaluation of alternative programs

He enumerated the premises underlying the rationale for budget innovations as:

(1) The budget in practice is the basic expression of the government's development program and policy decisions.

(2) The success of economic planning is dependent upon a budget system that can effectively translate a plan into reality.

(3) The budget mechanism offers a potential opportunity for overcoming those obstacles that have limited the effectiveness of long-term comprehensive planning.

According to Beyer, any serious attempt at innovation should be aimed at transforming the national budget into an effective instrument for resource allocation.

The budget along with planning is a major vehicle for planned development. The role of budgeting as discussed previously is very important as a means of allocating resources aimed at specific socio-political and economic goals. In centrally planned economies, planning and budgeting are viewed as integral processes. In mixed economies (e.g., Ghana), budgeting should strengthen plan objectives. In this context budget structures and

techniques need to be modified or supplemented in order to enhance their relevance to national political and administrative systems and their effectiveness for achieving national goals.[5] Based upon the above context a number of factors as determined by the expert group at the United Nations need to be recognized to ensure that the budget is effective in terms of goals and objectives. It is necessary to bear in mind that:

(a) Budget formulation is a participatory process in which the political decision makers, planners, and budget officials at the centre and planners and budget officials at the operating unit and public enterprises levels ought to participate.

(b) There is need for agreement at the centre on the total volume of resources to be mobilized and allocated, on a broad articulation of allocations by users and sources, and on a list of strategy and policy changes to be made during the budget year such as changes in tax structures and wages.

(c) The aggregative budgetary ceilings and the check list of policy changes should be transmitted to the operational units, which should prepare specific proposals for inclusion in the annual budget within this framework.

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[5]Budgeting and Planning for Development in Developing Countries. Report of the Meeting of the Expert Group on budget Formulation in Developing Countries. United Nations Headquarters, 20-27 October, 1975. United Nations, 1976, pp. 24-29.

(d) The process of budget formulation should be based on a set of relationships among key variables, such as overall policy goals and objectives, sectoral needs, local demands and requirements, resource availabilities and demands on them for anticipated outcomes.

(e) An annual budget should not and need not be looked upon as an unalterable set of programmes and proposals. Flexibility is required in both budget preparation and budget execution because during the budget period certain constraints may change.

(f) Budget procedures should be related to program goals and objectives, but procedures should not be used as substitutes for goals and should also not be used to block fulfillment of goals.

(g) budget execution and management require a regular and prompt flow of data on the amount of resources used and the results achieved.

In many developing countries the above factors are rarely taken into account either jointly or individually. Many problems that hinder their consideration will become evident as this essay progresses.

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2.2 BUDGET PROCEDURE

The process begins with the circulation of a document to all the Ministries and parastatals informing them of new directives and plans of action for the impending budget, and each Ministry is then responsible for disseminating the new rules and guidelines to the respective units under it.

With regard to the budget itself each unit prepares its budget which is usually a request for funds from the central government for construction of office buildings, purchase of furniture, and for salaries and allowances. This process starts from the local level to the district, to the regional level and finally to the departmental headquarters at Accra and at each level hearings are conducted as means of eliminating and substituting projects. The finance officers of these departments in consultation with their departmental heads prepare estimated needs of their departments based upon the estimates submitted from the local, district and regional levels and also upon the estimates of the headquarters. The total estimates of the departments are usually a certain percentage over the previous year's estimates; the justification usually being inflation.

The departments then forward their estimates to their ministry. At this level there is deliberation over the estimates because the ministry has to keep the overall estimates at a level that is competitive with estimates of other ministries.

The Ministry of Finance and Economic Planning which is the central planning and budgeting ministry has different sectors, each one of which is responsible for handling, examining and almost always reducing the estimates presented by the ministry that it oversees. At the sectoral level there are intense deliberations since each sector is expected to keep the overall estimates presented by the subordinate ministries within specified levels. The sectors are also expected to scrutinize the estimates for possible duplications and inconsistencies. There are budget hearings presided over by the Minister for Finance and Economic Planning at which the various sectors have to defend and justify the estimates presented by their respective ministries. Inability to justify the estimates may lead to across the board cuts or total elimination of projects, especially the new projects.

The Planning Division of the Ministry of Finance and Economic Planning handles the development (capital) budget while the Finance section handles recurrent budget. Either section uses the line budget system in that agencies within departments and ministries are budgeted for in isolation from other similar goals and functions. If program budgeting could be used, the Ministry of Finance and Economic Planning would be able to identify areas for trade-offs.

Projects approved by the Ministry of Finance and Economic Planning are then presented to Parliament for

deliberation and the Minister is responsible for defending the budget; in the case of military governments the budget once approved by the commissioner of Finance and Economic Planning is automatically approved by the Ruling Council since the commissioner is their direct representative.

One flaw as observed by Beyer (1973) in his study on Nepal, which applies in Ghana, is that the current and recurrent estimates are prepared and deliberated upon independently of the development estimates. There is no coordination at all and in this regard a construction project may be approved in the development budget without necessary provisions made in the recurrent budget for personnel and other staff that subsequently fill this project, this is particularly true for the construction of office buildings with no provision for personnel. The reverse also happens where estimates are approved for personnel expected to occupy an office building, or project that is rejected in the development estimates.

Once a budget has been approved the final estimates are prepared and mailed by the Ministry of Finance and Economic Planning to the various Ministries and Agencies. These published estimates are supposed to serve as the guideline for release of funds. Unfortunately, after the estimates are approved there is no monitoring and coordination due to lack of qualified personnel so projects that have been approved are either not undertaken and the money still appropriated or projects that are undertaken have funds

released which exceed the approved levels. Even if the agency does not require all of the appropriation requested for the project, the entire appropriation is usually approved if the project is located in the approving officers home district. Instead of reserves being established for such projects to be released when needed to prevent agencies from diverting funds from one project to an unapproved one.

Funds for approved projects are released by the Finance section when the contractor presents a certified bill. This certification is usually not verified by the ministry due to the lack of personnel and transportation and this contributes to mismanagement which affects the overall performance of the budget system.

Zero base budgeting has not been used by the agencies for reasons of unfamiliarity and political pressures. There is not enough courage to reduce estimates to zero for some uneconomic or unnecessary projects. Zero base budgeting would have allowed systematic increases or decreases in the level of operations of agencies. The agencies will be expected to justify their projects at alternative levels including a zero base or low level of operation. At the zero base the agency is expected to justify that the project performs a useful purpose, and must demonstrate how social benefits would be reduced in the absence of the project. Agencies therefore must justify their projects at existing levels and consider reductions as well as increments in their levels of operation each fiscal year. It is argued

that zero base budgeting improves the efficiency of
operations in government by forcing bureaucrats to consider
alternatives and think in terms of levels of output. It
also allows the use of incremental analysis in the public
sector by providing governing authorities with a constant
flow of information.

2.3 THE STRUCTURE OF THE MINISTRY

In section 2.2 the budget procedure was discussed but
another important factor that affects the budgets operation
and effectiveness is the structure of the Ministry.

In previous chapters I discussed some of the problems
that face Ghana as a country and suggested some solution
areas. From these solution areas I focussed on the budget
as perhaps our best strategy toward economic development in
particular and general welfare. With emphasis on the
development budget I reasoned that the budget has not been
effective as an instrument for economic development because
the projects that are included in the final estimates are
not adequately analyzed in terms of their profitability and
contribution to overall performance of the budget. Upon
using the net present worth method of benefit cost analysis
I came out with the conclusion that the Upper Region
Agricultural Development Project which was the major project
or one of the major projects initiated in 1976 should not
have been undertaken, at least not in the structure it was
originally designed. I suggested that an alternative design

would have been profitable by eliminating the unprofitable enterprises from the project.

I like to state, however, that the performance of the budget does not depend solely on adequate project analysis. The bureaucratic structure of the Ministry of Finance and Economic Planning does affect the performance of the budget. The Ministry has four major divisions with each such division having subdivisions that carry out specific function. The four divisions are:

(1) General Administration (control)

(2) Budgeting, Implementation and Monitoring

(3) Development Planning

(4) External Aid

General Administration division deals with financial policy and control, credit, investment, banking and currency matters and is also responsible for the country's relations with the International Bank for Reconstruction and Development, the International Monetary Fund, the International Development Association and the African Development Bank. The division also collects, assembles and analyzes data on economic development inside and outside the country which have particular bearing on domestic financial and economic policy. It also undertakes analysis and appraisal of investment projects and proposals for project financing.

The budgeting division co-ordinates, examines and prepares annual estimates for revenue and expenditure. It

exercises control over expenditure and revenue and Inspects publicly financed projects. It also explains financial policy of the government and is responsible for ensuring that all projects earmarked for execution in the capital budget estimates are effectively and efficiently undertaken.

The Development Planning division is responsible for general economic policy of the government, economic planning, preparation and review of development planning and priorities, and regional planning while the External Aid division is the central co-ordinating agency for all foreign aid including technical assistance.

From a planning standpoint the ministry uses the budget as an allocative mechanism for the disbursement of scarce resources among conflicting and competing claims and also as an incentive mechanism to influence the decision making and choice processes of the private sector by effecting changes In taxes and exchange rates as well as In interest rates. These functions of the budget are, however, not effective because of the absence of good budgetary practices. According to Waterston (1979, p. 109) budgets have certain inherent deficiencies which greatly diminish their usefulness as Instruments for promoting development, but ridding the budgets of these deficiencies would not make them remain as budgets. In most of the budgets put forward In Ghana, projects and programs Incorporated In the capital budget outlays are as already discussed rarely selected on the basis of their relative costs and benefits. Only

limited attempts are made to relate projects and programs, and the main requirement for internal consistency is that the sum of the parts should equal the total. Also as an incentive mechanism the budget fails because of the persistence of distortionary exchange and interest rates.

One of the important problems that hinder the effectiveness of the budget from a ministerial standpoint is organization. The ministry operates on the blue-print concepts of implementation (J. R. Moris, chapter two). The development of the country is seen as the design by planners of arrangements which can produce needed outputs, that is, creating effective projects. The ministry relies on information supplied by agencies notably the Central Bureau of Statistics. It then processes these information into projections (development plan targets) and diagnoses problems and attempts to rectify such problems through the budget. Planning is thus based on a big-picture approach with emphasis on the achievement of physical targets. Every rule or regulation, goal and target emanates from the ministry. Policies are circulated from the center to the other ministries and to the regional planning officers who are then expected to help in the implementation of such policies regardless of the specific needs of the regions in which they are located. Much of what goes on in the ministry fits the pattern which Chambers (1983) characterizes as "planning without implementation" at the center and "implementation without planning" in the field.

By relying on experts from the Ministry and its agencies the approach violates the integrated approach to budgeting conceptualized by Doh which implies the inclusion of social, political, geographical, environmental, cultural and historical factors as well as economic efficiency criterion in decision making. This center to periphery and top-down approach also conflicts with the expert group of the United Nations' suggestion that the budget formulation be made a participatory process in which political decision makers, planners and budget officials at the center, operating units and other levels ought to participate.

Another important factor that affects the ministry's usage of the budget as an instrument for promoting development is the subtle power struggles that persist. Each of the four divisions has a principal secretary that is as equally qualified as the others. None of them is prepared to let his or her division play a subordinate role to the others. An enumeration of the general functions indicate, however, that possibilities do exist for conflicts because of overlapping roles. Who takes change when such roles overlap becomes a major problem. There is also the problem of who has the final say. While the general administration appraises projects and the budgeting division prepares revenue and expenditure estimates, it is the planning division that actually determines which projects are included in the budget. The planning division is however, not responsible for the monitoring of such

projects. Conflicts thus do arise in the execution of policy. In a similar fashion conflicts can arise between the general administration division and the external aid division because their functions do overlap.

2.4 <u>PURPOSE OF STUDY</u>

Three objectives that are expected to be achieved by the budget have been listed as;

(i) Stable macroeconomic environment;

(ii) Provision of incentives;

(iii) Establishment of a pattern of growth and development.

For the purpose of this study the third objective is the most important. The establishment of a pattern of growth and development requires that revenues be appropriated in a desirable manner. This can occur either through direct outlays to desired sectors or through an appropriate strategy of development of infrastructure that, in turn, will induce further investment. Desired sectors refer to those areas of economic activity which contribute most to the solution of the problems of unemployment, balance of payments, and inflation. Percentage distribution of gross domestic product by kind of economic activity is presented below in Table 2.1 to identify the sector that contributes most to the economy with agriculture and cocoa being the principal sectors.

Table 2.1: Percent Distribution of Gross Domestic Product
by Kind of Economic Activity

Item	1970	1973	1976	1979	1981
Agriculture and livestock	27.5	29.8	26.4	37.1	37.6
Cocoa Production	16.8	15.1	14.6	10.3	9.7
Forestry	4.9	5.2	6.0	5.1	5.7
Fishing	1.5	1.2	1.6	1.6	1.7
Mining	2.4	2.3	2.0	1.3	1.2
Manufacturing	12.7	12.7	13.8	10.7	10.9
Electricity and water	0.3	0.7	0.7	0.7	1.0
Construction	3.9	4.3	4.7	2.3	2.1
Wholesale, retail trade	11.3	12.4	11.1	10.1	8.4
Restaurants and Hotels	0.5	0.5	0.6	0.1	0.2
Transport, Storage, Communication	2.9	3.1	3.3	2.8	3.1
Finance and Insurance	5.7	5.5	5.8	6.5	6.9
Community, Social, Personal Services	0.5	0.7	0.9	0.9	0.8

Sources: Economic Surveys, 1972-74, 1975-76, 1977-80,
Quarterly Digest of Statistics, June 1983.

The Figures for each column may not add up to a hundred percent because bank charges, government services, private non-profit services and import duties are excluded. The exclusion of these areas does not affect the argument that agriculture is the most important sector. To augment the above statement, Table 2.2, below, is presented to highlight the importance of agriculture as the major export earner.

Figures show that agriculture has maintained at least 60% share of the value of total exports over the years. Given the general deterioration of the economy in recent years and the inability to sustain imported inputs for the manufacturing industries, agriculture's share has increased substantially, although the general volume and value of total exports has dwindled. Another evidence to support agriculture as the most important sector can be found in recorded employment, as shown in Table 2.3.

Table 2.2:   Share of Commodities in Exports (percent)

Item	1970	1974	1976	1979
Agriculture				
(mostly cocoa product)	71	69	64	72
Log and timber	8	13	9	4
Minerals	11	15	11	10
Others	10	3	16	14

Source: Quarterly Digest of Statistics, March 1983,
          pp. 64-67.

Table 2.3:   Recorded Employment in Establishments with
             10 or more employees ('000)

Item	1971	1973	1975	1977	1979
Agriculture, Forestry Fishing	45.5	54.5	63.3	66.3	73.9
Mining, Quarrying	24.1	26.5	21.6	12.1	8.9
Manufacturing	56.1	56.5	60.7	54.0	48.3
Electricity, Water, Gas	16.5	8.2	9.0	8.5	9.1
Construction	44.1	39.9	43.3	36.6	28.5
Wholesale, Retail Trades	33.9	31.7	33.8	33.6	31.6
Transport, Communication	31.6	26.9	25.3	21.3	18.8
Finance, Insurance, Real Estate	-	14.2	14.6	12.6	12.7
Community, Social, Personal Service	144.8	150.8	159.8	178.1	196.9

Source: Quarterly Digest of Statistics, March 1983, p. 43.

From the above table, it is recognizable that agriculture's share in recorded employment has been increasing over the years when compared with important export earners like mining and quarrying, and manufacturing. The share of agriculture would be more substantial if we considered establishments with fewer than 10 employees since small scale rural farmers are very numerous.

It is also necessary to recognize the role that agriculture plays in lessening the rate of inflation. If agricultural productivity increases it is reflected in a reduction in food prices and since food consumption expenditures constitute a large fraction of total consumption, the effect is felt through an increase in real income.

The focus below will be on expenditures based on the assumption that revenues are known or can be forecasted reasonably. Expenditures are usually analyzed in a three-fold framework:

(i) Economic control: this analysis examines the economic framework of the budget. It involves analyses of the incidence of taxes and expenditures, and their distributional issues.

(ii) Accountability: this analysis describes political processes for determining allocation of resources among competing ends. It also involves management principles including proper accounting procedures and auditing. The public administration aspect of

accountability, for instance, involves a description
of the internal working of administrative agencies,
and stages of the budget cycles.

(iii) Efficiency: this is the framework of relevance to
this study, which deals with allocative efficiency,
and involves identification and appraisal of projects
and programs. Cost determination and constraints are
also analyzed.

The agricultural sector is the focus of this analysis
because of its high importance to the economy, with the
study concentrating on the agricultural development budget
(agricultural capital budget). Over the years large sums of
money have been allocated to the Ministry of Agriculture for
development purposes. However, productivity in the
agricultural sector has not experienced any major increases.
The food crises of the late 1970s and early 1980s are a
testimony to this fact.

2.5 HYPOTHESIS   The agricultural development budget has not
been effective in increasing agricultural
productivity. (This of course applies to
the economy as a whole). This assumes that
the problem does not lie with technology or
other factors although productivity can
also level off even with advanced
technologies.

There is a tendency, before the fact, to associate
increasing budget size with performance. Experiences over

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the years in Ghana have shown however, that there may be no correlation between budget size and productivity. By the above hypothesis I am attempting to isolate the budget and productivity from all other factors like the availability of inputs, the state of the environment, quantity and quality of labor and also demand factors. I am contending that when officials do make these budget decisions they assume that all of the above factors will be favorable and that is not always the case.

The objective of this study is to take the development budget and examine projects included in this budget and determine whether or not these projects contribute to development. One way of analyzing their effect on development is by analyzing the profitability or, in this case, the net worth of each project. However, since it will not be possible to carry out this type of analysis for all projects, I limit myself to one project and use benefit-cost analysis to evaluate its importance. Details of the objective are provided under a plan of study in section 2.6 beginning on page 58.

To support the above hypothesis a statistical summary as shown below is in order:

Table 2.4:   Statistical Summary

(1971 = 100)

	1977-79	1980-81	1982	1983	1984
Average index of food Production per capita	82	74	65	73	73
Daily per capita calorie supply (as percentage of requirement)	86	88	68	66	-
Life expectancy at birth	49	54	53	59	53
Food aid (cereals in '000 metric tons)	-	46	94	58	74
Cereal imports ('000 metric tons)	-	256	211	285	311

Sources: World Development Reports (1981-1986)
           Ghana: Policies and Program for Adjustment (1984),
           p. 28

Table 2.4 gives an indication of the food situation in the country. It shows a declining trend in food production from the 1970s through the early 1980s resulting in diminished calorie supply. While life expectancy and food aid do not follow a specific trend cereal imports seem to be on the increase. The budget has been ineffective not because of the size, but because funds are allocated to projects that are marred by inefficiencies. Decreasing budget size will lead to hard choices, but perhaps the most important point is to eliminate or reduce inefficiencies. Change in tastes and preferences could also lead to increased imports of food, but given the limited foreign exchange and the strict government controls on imports and exports, it would be difficult for the private sector, for instance, to react to such changes by increasing imports. Any increases in imports are permitted as seen fit by the government in order to minimize citizen discontent.

To further support the hypothesis, the table below (Table 2.5) is included to indicate the kind of food items that are imported. These items transcend all food classes thus illustrating the inadequacies in domestic production. Table 2.5 is therefore being furnished in lieu of the unavailability of statistics on food requirements and

Table 2.5:   Imports of Selected Food Items

(US $ million)

	1979	1980	1981
Live animals	1.3	1.8	2.0
Meat	8.7	12.6	22.2
Dairy Products	5.6	6.7	4.7
Cereals	48.5	59.7	72.9
Fruits & Vegetables	52.5	58.9	69.4
Sugar & Honey	19.8	10.6	25.7
Processed oils	1.7	1.8	2.2
Fishery Products	9.4	4.8	4.5

Source: Consumer Markets in West Africa
        (Euromonitor Publications 1984), p. 85

deficiencies. On the average imports of these items have increased since 1979.

One of the reasons for low productivity may be the allocative inefficiency of the budget in the selection and implementation of projects. Drought is also a reason for low productivity and its effects will be discussed in a later chapter together with incentive effects. Apart from a few projects that have been initiated recently, most projects included in the budgets for the years following 1975 are those listed in the five year development plan of 1975/76 - 1979/80. The decision as to which projects are implemented first is not based on the net worth of such projects. Such decisions are made at the administrative level by civil servants of the various agencies and departments based mostly on politics and home districts. At the public administration level, heads of the subunits of the ministry of agriculture arbitrarily decide on a number of projects (such projects being part of the plan) that they want to undertake and present these to the ministry's central administrative office. Estimated costs of these projects are based on prevailing market prices, with the notion that they can always apply for more funds should costs increase. An important reason for the selection of projects at the subunit level is the maximization of the unit's budget as a way of boosting the unit's image and increasing the prestige of officers. The central administrative office of the ministry then selects from

among these projects those that help to meet national objectives as stated in the plan. After selecting these projects they then estimate their costs and benefits based on market prices and proceed to implement those that have positive net benefits. As is so often the case in most countries the process of selection of projects is often influenced by political considerations and the location of the project.

2.6 PLAN OF STUDY

The plan is to select the Upper Region Agricultural Development Project as a case study of inadequate analysis and implementation of projects. A cost-benefit analysis has already been carried out for this project which has subsequently been implemented. This project is selected because it is a big one by Ghanaian standards and it has also been fully implemented. It is a joint project (I.B.R.D./Upper Region Agricultural Development Project) with the latter being the implementing agency.

The crops involved are rice, millet, groundnut and cotton. Rice and millet are staples that have experienced productivity shortfalls and increased imports (especially rice). Groundnut is a source of processed oils, paste and residues for animal and human use. Cotton is an important raw material source for the country's spinning and textile mills. The project is one of a number of such projects each designed for a different region as a basis for balanced

regional development under the campaigns of "operation feed yourself" and "operation feed your industries". The principle of just allocation by region (each region having development projects based on population and development) guided the establishment of this project and those that followed. The projects are all intended to supplement each other in satisfying the food and raw material needs of the country. The upper region has agronomic conditions suited for the development of the crops in question and farmers in this region were already growing these crops. Even though similar projects had been planned for all the regions, this one was the first to be initiated in co-operation with the World Bank because the region was the least developed in the country and thus the project was used to satisfy the principle of just allocation as explained above.

This study will concentrate on only the crops portion because grain imports constitute a much more important drain on foreign exchange reserves than do meat imports and also because the livestock portion was relatively too small. Omission of the livestock portion of the project would not bias the evaluation because the livestock portion is not linked with the crop portion. Farmers participating in the livestock project are not necessarily the same ones participating in the crops project. It is therefore possible to undertake separate evaluation for both aspects of the project. I also do not consider the livestock project to be vital because there are enough of such

projects in the country to meet the meat requirements. There are numerous Cattle Development Board projects. There are also the Ghana-Austria Project and Animal Husbandry Projects that for reasons similar to those pertaining to URADEP would help to lessen meat deficiency.

The objective of the study is to carry out the analysis again based on revised prices for materials and equipment as well as output. From the above discussion one can deduce the primary sources of inaccuracy to be prices and the discount rate. The inaccuracy in prices stems from the use of inappropriate foreign exchange rates and the use of administered prices to calculate costs and benefits. The discount rate used to discount net flows does not reflect scarcity of resources because all such rates are fixed and do not depend on market forces.

2.7 SUB-HYPOTHESIS

"The initial project analysis was based on prices which do not accurately reflect scarcity of resources. The results obtained are thus not a proper basis for the project's implementation." The conclusions that will be drawn from the results are applicable to all projects included in the budget because the four major organizations that conduct feasibility studies and carry out project analysis use the same principles and methods. The organizations referred to are (i) the National Investment Bank, (ii) the Capital Investment Board, (iii) the

Agricultural Development Bank, and (iv) Bank for Housing and Construction.

In view of the similarities in methods used there is sufficient justification to generalize that a considerable number of the projects in the annual budgets are implemented on the basis of inadequate information and inaccurate analysis. One would surmise that other approaches such as working through the private sector and/or foreign investment would set in to fill some of the vacuum, but such sources have not been forthcoming for fear of confiscations and nationalizations. Domestic investors, for instance, engage in speculative activities rather than in relatively long term investments because of the high rate of inflation. For these reasons and others that will be discussed in subsequent chapters, one can conclude that the budget has been ineffective and will continue to be inefficient as an allocative mechanism until proper procedures coupled with adequate information and analysis become prevalent.

In the next chapter I present the data and data sources. The original analysis as summarized in Gittinger's book will be presented and used as the basis for comparison. The next part of the data will be the original (raw) data obtainable from the World Bank and Ghana government sources.

CHAPTER 3

Data Presentation and Sources

3.1. ORIGINAL ANALYSIS

This refers to the Upper Regional Agricultural Development Project which is summarized in Table 8-1 of the second edition of J. P. Gittinger's book "Economic Analysis of Agricultural Projects" and presented below. The figures are in c'000s. For the purpose of this essay the table in question is being reproduced as Table 3.1 titled "Economic Analysis of the Upper Region Agricultural Development Project."

The first part of the table deals with on-farm costs and benefits. Incremental crop benefit refers to the increase in crop output resulting from the project while the incremental livestock benefit is the increase in livestock resulting from the project. The incremental crop and livestock inputs refer to input increases incurred on the farm as a result of the project. It is maintained that these figures are not true reflections of costs and benefits since they do not take into account with and without project situations. The other parts of the table subtitled "crops and livestock" deal with off-farm costs for the crops and

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Table 3.1: Economic Analysis of the Upper Regional
Agricultural Development Project ('000 cedis)

Item	Project year 1	2	3	4-20
Incremental crop benefit	1,829	7,071	14,217	36,822
Incremental livestock benefit	763	1,065	2,542	9,482
Total inflow	2,592	8,136	16,759	46,304
Incremental crop input	2,635	5,836	9,464	18,724
Incremental livestock input	299	477	385	234
Total on-farm cost	2,934	6,313	9,849	18,958
Crops				
Buildings	4,709	3,476	1,895	0
Plants, vehicles, equipment	6,249	1,505	240	383
Salaries, allowances	1,487	1,730	1,840	482
Plant and vehicle operation	446	1,254	1,335	967
General administration	65	43	25	0
Physical contingencies	648	396	267	92
Total crop administrative and processing cost	13,604	8,404	5,602	1,924
Livestock				
Buildings	942	662	0	0
Plants, vehicles, equipment	245	65	0	57
Salaries and allowances	264	275	275	215
Plant and vehicle operation	71	82	82	82
Physical contingencies	76	54	18	18
Total livestock administrative and processing cost	1,598	1,138	375	372
Total outflow	18,136	15,769	15,826	21,254
Incremental net benefit (cash flow)	(15,544)	(7,633)	933	25,150

Figures in parenthesis are negative.

Net present worth at 12 percent opportunity cost of capital = ¢ 85,274

livestock projects respectively. The items in these sections include office buildings as well as residential quarters for the project staff. "Plants, vehicles, and equipment" include generators, cars and tractors while "salaries and allowances" constitute renumeration for the project staff. "General administration" includes stores and stationery, equipment like typewriters, duplicating machines, stencils and administrative and clerical activities. "Physical contingencies" generally refer to allocations set aside to take care of damages caused by brush fires and deterioration to the buildings and other structures. The problem with physical contingency is that it acknowledges the seriousness of damages only in the first three years of the project.

3.2 CROP DATA

The targeted acreage for the listed crops as estimated in the 1975/76 - 1979/80 Development Plan Part II are as shown in Table 3.2. According to officials at the Ministry of Finance and Economic Planning the acreage for each crop will be the same for all the different enterprises under this crop heading. Even though these officials could not state categorically the acreage to be brought under cultivation each year, they did agree that since a lot of the expenditures are being incurred in the first 3 years they expected much of the acreage to be cultivated in the first 3 years. As to what formula will be used they indicated that perhaps the acreage should

Table 3.2: Acreage Targeted for Listed Crops

CROP	LAND (acres or hectares)
Rice	48,000 or 19,200 ha.
Millet	65,000 or 26,000 ha.
Cotton	50,000 or 20,000 ha.
Groundnut	63,000 or 25,200 ha.

where 2.5 acres = 1 hectare

Source: 1975/76 - 1979/80 Development Plan Part II

reflect in proportionate terms the percentage of costs incurred for the particular year. Out of this acreage each enterprise gets equal share of land area. Of course this is important mostly for the first 3 years for the reason that has been stated above. This means that about twenty five percent (25%) of the acreage will be brought under cultivation in the first year, about twenty two percent (22%) in the second year and about twenty two percent (22%) in the third year. The remaining thirty one percent (31%) will be brought under cultivation in equal amounts over the the next seventeen (17) years.

From Table 3.2 the total acreages for the crops are: rice (48,000 acres or 19,200 hectares), millet (65,000 acres or 26,000 hectares), cotton (50,000 acres or 20,000 hectares) and government (63,000 acres or 25, 200 hectares).

3.3 FARM MODELS

These models are just simplified representations of typical farms included in the project. These models serve two important functions as discussed by M. L. Brown (1982). They facilitate analysis of the attractiveness of the project to different groups of farmers and help in the aggregation of the projects' total costs and benefits. One can observe changes in output and also in input structures between models. Except where explicitly stated; harvesting includes dehusking and shelling. No reasons were given in situations where these activities

were separated. The number of models reflects the wishes of bureaucrats rather than what the nature of the project determined. As will become evident in the analysis, not all enterprises are profitable. Assumptions made by officials at the Ministry of Finance and Economic Planning about phasing of the area to be brought under the influence of the project and projection of increases in productivity all reflect what these officials would like the farmer to do and not necessarily what the farmers are likely to do.

The years four to twenty (4-20) have been aggregated for convenience. No aggregation error is incurred and hence the analysis is not affected because each year has been worked out separately and then added in order to save space.

Table 3.3 refers to the traditional method for rice cultivation. The estimated output per hectare is one thousand kilograms per year (1000 kg/year) over the life of the project. As regard inputs, mandays of labor required in the first year are three hundred and forty three (343) days. This number reduces to two hundred and ninety three (293) days over each of the next nineteen years. Landclearing required fifty mandays and this was only in the first year. With constant usage and weeding there was no need for any clearing in subsequent years. Seed ·broadcasting took five mandays of labor per year over the life of the project. Since this is the traditional

Table 3.3: (Rice) Traditional Method (1.0 hectare)

Physical	Unit	Project Year 1	2	3	4-20
Output	kg	1000	1000	1000	17,000
Inputs					
Labor:	mandays	343	293	293	4,981
Landclearing		50	–	–	–
Seedbroadcasting		5	5	5	85
Fertilizer application		–	–	–	–
Weeding		100	100	100	1,700
Birdscaring		148	148	148	2,516
Harvesting		40	40	40	680
Seed	kg	70	70	70	1,190
Fertilizer:	kg	–	–	–	–
15:15:15		–	–	–	–
Sulphate of ammonia		–	–	–	–
Seed dressing	gm	–	–	–	–
Storage chemical	gm	–	–	–	–
Tools and others	nos.				
Hoe		1	–	1	8
Sickle		1	–	1	8
Sack		5	–	5	40

Source: Ministry of Agriculture; Ghana Agricultural Sector
Review

method there was no fertilizer application. It took one hundred mandays of labor per year for weeding over the life of the project. Child labor was used to scare away birds from destroying the crop and this required one hundred and forty eight days of labor per year over the lilfe of the project. It took forty mandays of labor per year to harvest the output. Seventy kilograms of seeds was applied per hectare per year. No ferilizers of other chemicals were used. The tools used by the farmers were hoes and sickles (cutlasses) and for each hectare the farmers used one hoe and one sickle. These tools had a life span of two years so no tool purchases were made or included for every other year over the project's life. Each sack could load approximately two hundred kilograms of grain so five sacks were required. The lifespan of a sack was also estimated at two years so no sack purchases were made or included for every other year over the project's life.

Table 3.4 refers to the improved method for rice cultivation. The output per year over the project's life is fourteen hundred. There are some variations in the input structure when compared with the traditional method. The improved method required three hundred mandays of labor in the first year and three hundred mandays for each of the subsequent years. These requirements are slightly higher that the requirements for the traditional method over the years that they represent. Landclearing still required

Table 3.4: (Rice)   Improved Method (1.0 hectare)

Physical	Unit	Project Year			
		1	2	3	4-20
Output	kg	1400	1400	1400	23,800
Inputs					
Labor:	mandays	350	300	300	5,100
Landclearing		50	–	–	–
Seedbroadcasting		5	5	5	85
Fertilizer application		2	2	2	34
Weeding		100	100	100	1,700
Birdscaring		148	148	148	2,516
Harvesting		45	45	45	765
Seed	kg	70	70	70	1,190
Fertilizer:	kg				
15:15:15		125	125	125	2,125
Sulphate of ammonia		125	125	125	2,125
Seed dressing	gm	210	210	210	3,570
Storage chemical	gm	–	–	–	–
Tools and others	nos.				
Hoe		1	–	1	8
Sickle		1	–	1	8
Sack		7	–	7	56

Source: Ministry of Agriculture; Ghana Agricultural Sector
Review

fifty mandays of labor and this took place in the project's first year. Seed broadcasting also required five mandays of labor per year. Unlike the traditional method, the improved method included the use of fertilizers for which two mandays of labor were required per year over the project's life. One hundred mandays of labor were required for weeding per year while one hundred and forty eight days of child labor were required to scare away the birds. Because of the estimated increase in output, harvesting required forty five mandays per year as opposed to forty mandays under the traditional method. the same number of kilograms of seed (seventy) was also required per year over the project's life. The significant change in the input structure was the the use of fertilizer. Two types of fertilizer wer used. One hundred and twenty five kiolgrams of 15:15:15 and the same weight of sulfate of ammonia were applied per hectare per year over the project's life. The seeds were also treated with seed dressing for which two hundred and ten grams were required per year. One hoe and one sickle were required for every other year. Seven sacks were required in the first year and for every other year to hold the output.

The Table 3.5 refers to the advanced method of rice cultivation. The estimated output per year is two thousand kiligrams per hectare over the span of the project. As regards inputs a total of two hundred and eighty mandays will be required every year. One difference between the

Table 3.5: (Rice)   Advanced Method (1.0 hectare)

Physical	Unit	Project Year			
		1	2	3	4-20
Output	kg	2000	2000	2000	34,000
Inputs					
Labor:	mandays	280	280	280	4,760
Landclearing		–	–	–	–
Seedbroadcasting		5	5	5	85
Fertilizer application		2	2	2	34
Weeding		75	75	75	1,275
Birdscaring		148	148	148	2,516
Harvesting		50	50	50	850
Seed	kg	80	80	80	1,360
Fertilizer:	kg				
15:15:15		125	125	125	2,125
Sulphate of ammonia		250	250	250	4,250
Seed dressing	gm	240	240	240	4,080
Storage chemical	gm	800	800	800	13,600
Tools and others	nos.				
Hoe		1	–	1	8
Sickle		1	–	1	8
Sack		10	–	10	80

Source: Ministry of Agriculture; Ghana Agricultural Sector
Review

advanced method and the previous two methods is that government machinery was used for the landclearing for which a lump sum fee of two hundred and sixty five cedis was charged per hectare for the first year. Seed broadcasting required five mandays per year, while fertilizer application took two mandays per year. The seventy five mandays of labor required for weeding was less than was required under the traditional and advanced methods because the machines were able to uproot most of the roots and thus limit weed growth. The same number of days of child labor (one hundred and forty eight) was needed to scare away birds from the crop. There was an increase in the number of mandays of labor needed for harvesting from forty five for the advanced method to fifty because of the expected increase in output. Eighty kilograms of seeds was needed per year, while one hundred and twenty five kilo grams of the fertilizer 15:15:15 was required. Two times the weight of 15:15:15 was required in the use of the other fertilizer, sulfate of ammonia. Two hundred and fory grams of seed dressing was required. The other variation for this enterprise was the usage of storage chemicals of eight hundred grams per hectare per year. The increase in output was matched by a corresponding increase in the number of sacks required to bag the output.

Table 3.6 refers to the irrigated method for rice cultivation. The output per hectare per year over the project's life span was estimated at thirty five hundred

Table 3.6: (Rice) Irrigated Method (1.0 hectare)

| Physical | Unit | Project Year | | | |
		1	2	3	4-20
Output	kg	3500	3500	3500	59,500
Inputs					
Labor:	mandays	125	125	125	2,125
Landclearing		–	–	–	–
Seedbroadcasting		5	5	5	85
Irrigation		15	15	15	255
Weeding		45	45	45	765
Harvesting		60	60	60	1,020
Seed	kg	90	90	90	1,530
Fertilizer:	kg				
15:15:15		250	250	250	4,250
Sulphate of ammonia		250	250	250	4,250
Seed dressing	gm	270	270	270	4,590
Storage chemical	gm	1,400	1,400	1,400	23,800
Tools and others	nos.				
Hoe		1	–	1	8
Sickle		1	–	1	8
Sack		18	–	18	144.

Source: Ministry of Agriculture; Ghana Agricultural Sector
        Review

kilograms. There was a decline in the total number of mandays of labor but this is translated into an increased in the cost structure because of the reliance on geovernment owned and operated mechanization facilities for landclearing, irrigation, harvesting and seed broadcasting. As a result of the mechanization activities fice mandays of labor were required for seedbroadcasting and fifteen mandays for irrigation related activities. Weeding required forty five mandays of labor while harveting took sixty mandays. Ninety kilos of seed for planting was needed while two hundred and fifty kilos of 15:15:15 and the same quantity of sulfate of ammonia will be used. Two hundred and seventy grams of seed dressing will be requires as well as fourteen hundred grams of storage chemical. To bag the output eighteen sacks will be needed.

Table 3.7 refers to mechanized method of rice cultivation. There is a significant reduction in the estimated output when compared to the irrigated method of rice cultivation. The estimated output is one thousand kilos per hectare per year. On the input side thirty mandays of labor were required per year for weeding. All the other activities classified under labor are accounted for in the cost structures. Seed broadcasting, fertilizer application and harvesting were all accounted for in lump sum fees paid to the government for services obtained by use of government machinery and their operators. About seventy

Table 3.7: (Rice) Mechanized Method (1.0 hectare)

Physical	Unit	Project Year 1	2	3	4-20
Output	kg	1000	1000	1000	17,000
Inputs					
Labor:	mandays	30	30	30	510
Landclearing		–	–	–	–
Seedbroadcasting		–	–	–	–
Fertilizer application		–	–	–	–
Weeding		30	30	30	510
Harvesting		–	–	–	–
Seed	kg	70	70	70	1,190
Fertilizer:	kg				
15:15:15		250	250	250	4,250
Sulphate of ammonia		125	125	125	2,125
Seed dressing	gm	210	210	210	3,570
Storage chemical	gm	400	400	400	6,800
Tools and others	nos.				
Hoe		1	–	1	8
Sickle		1	–	1	8
Sack		5	–	5	40

Source: Ministry of Agriculture; Ghana Agricultural Sector
Review

kilos of seed were required, while two hundred and fifty kilos of 15:15:15 fertilizer was required per hectare per year.

On the other hand only a hundred and twenty five kilos of sulfate of ammonia fertilizer were required. Despite the relatively low seed requirement and output level, about two hundred and ten grams of seed dressing and four hundred grams of storage chemical were required. Due to the estimated output of a thousand kilos only five sacks were required. The important point to note about the mechanized method is that while it led to increases in input costs it only yielded just as much as was estimated for the traditional method.

Table 3.8 refers to the traditional method of millet cultivation. Millet is not a widely consumed product although it is a major staple of the peoples in the northern and upper regions of the country. Its inclusions in the project is in line with the policy of satisfying domestic food consumption by encouraging local production. By also encouraging farmers in the area to improve efficiency it is hoped that their output and incomes will increase. The estimated output per hectare per year was four hundred kilos. Millet cultivation is a tedious process which requires a lot of labor. Three hundred and eighty five mandays of labor were required in the first year of the project. Two hundred and forty of these days were required for land clearing while forty days were required

Table 3.8: (Millet) Traditional Method (1.0 hectare)

Physical	Unit	Project Year 1	2	3	4-20
Output	kg	400	400	400	6,800
Inputs					
Labor:	mandays	385	90	145	1,970
Clearing		240	-	-	-
Land preparation		40	-	40	320
Planting		15	-	15	120
Weeding		40	40	40	680
Harvesting		30	30	30	510
Dehusking & shelling		20	20	20	340
Fertilizer application		-	-	-	-
Seed	kg	14		14	112
Seed dressing	gm	-	-	-	-
Storage chemical	gm	-	-	-	-
Fertilizer:	kg				
15:15:15		-	-	-	-
Sulphate of ammonia		-	-	-	-
Tools and others	nos.				
Hoe		1	-	1	8
Sickle		1	-	1	8
Sack		2	-	2	16

Source: Ministry of Agriculture; Ghana Agricultural Sector Review

for land preparation and another fifteen days for planting. The clearing, as was the case with rice cultivation, was a one time thing. The millet crop also has two major yields thus there was no need for land preparation or planting in the second year. These activities took place every other year. There had to be weeding every year of which forty mandays of labor were required. Harvesting required thirty mandays of labor per year while dehusking and shelling required twenty mandays per year. Under the traditional method there was no fertilizer application. Fourteen kilos of seed were required for planting every year. The seeds were not treated so there was no need for seed dressing, neither was there any need for storage chemical because the output per year was expected to be consumed that year. A hoe and sickle were required in the first year and every other year. Two sacks were also required every other year to bag the output.

Table 3.9 refers to the improved method of millet cultivation. The estimated output per hectare per year is eight hundred kilos over the life of the project. There is also an increase in the number of mandays required in the first year from three hundred and eighty five (traditional) to four hundred and fifteen. The same number of mandays required for clearing, land preparation, planting and weeding under the traditional method also apply under the improved method. More mandays are, however,

Table 3.9: (Millet) Improved Method (1.0 hectare)

| Physical | Unit | Project Year | | | |
		1	2	3	4-20
Output	kg	800	800	800	13,600
Inputs					
Labor:	mandays	415	115	175	2,435
Clearing		240	–	–	–
Land preparation		40	–	40	320
Planting		15	–	15	120
Weeding		40	40	40	680
Harvesting		45	45	45	765
Dehusking & shelling		30	30	30	510
Fertilizer application		5		5	40
Seed	kg	14	–	14	112
Seed dressing	gm	42	–	42	336
Storage chemical	gm	–	–	–	–
Fertilizer:	kg				
15:15:15		100	–	100	800
Sulphate of ammonia		100	–	100	800
Tools and others	nos.				
Hoe		1	–	1	8
Sickle		1	–	1	8
Sack		4	–	4	32

Source: Ministry of Agriculture; Ghana Agricultural Sector Review

required for harvesting and dehusking and shelling respectively due to the expected increase in estimated output. Fertilizer is also applied under this method and this requires five mandays in the first year and every other year. The same quantity of seeds (fourteen kilos) will also be required every other year for planting. Before planting the seeds were expected to be treated and this would require forty two grams of seed dressing. Two hundred kilograms of fertilizer was also applied, and four sacks were needed every other year to bag the output. As I have already stated, millet is a grain that is consumed locally in the northern and upper regions. The limited marketability prevents many farmers from producing traditional and improved methods of cultivation. Labor usage also declines after the first year because of the absence of clearing and the accompanying need for mandays of labor.

Table 3.10 refers to the traditional method of cotton cultivation. The estimated yield per hectare per year is five hundred kilos over the project's life span. Two hundred and forty mandays of labor are required in the first year of the project but this reduces to one hundred and ninety mandays per year over the next nineteen years because of the absence of land clearing and its labor requirement of fifty mandays. Land preparation requires mandays per year over the project's life while planting requires about twenty mandays of labor per hectare per year

Table 3.10:   (Cotton) Traditional Method (1.0 hectare)

Physical	Unit	Project Year			
		1	2	3	4-20
Output	kg	500	500	500	8,500
Inputs					
Labor:	mandays	240	190	190	3,230
Landclearing		50	–	–	–
Land preparation		50	50	50	850
Fertilizer application		–	–	–	–
Planting		20	20	20	340
Weeding		40	40	40	680
Harvesting		80	80	80	1,360
Seed	kg	70	70	70	1,190
Fertilizer:	kg				
15:15:15		–	–	–	–
Sulphate of ammonia		–	–	–	–
Seed dressing	gm	–	–	–	–
Tools and others	nos.				
Hoe		1	–	1	8
Sickle		1	–	1	8
Sack		3	–	3	24

Source: Ministry of Agriculture; Ghana Agricultural Sector
          Review

over the project's duration. Weeding will require about forty mandays of labor per hactare per year while harvesting required eighty mandays per hectare per year. Fertilizer was not applied, neither was seed dressing. Seventy kilos of seed were required for planting, and three sacks were required for bagging the out put. As will become evident in the cost tables corresponding to these physical input tables, there seem to be too many inputs for too little output for the different kinds of enterprises for cotton cultivation and this will have adverse effects on the profitability of the project as a whole.

Table 3.11 refers to the improved method of cotton cultivation. It was estimated that output per hectare per year would be about a thousand kilos. On the input side two hundred and sixty two mandays of labor were required for the first year of the project. This figure reduced to two hundred and twelve mandays per hectare per year over the next nineteen years accounting for the fact that landclearing which required fifty mandays in the first year is a one time activity and was not required in the following years. Land preparation required fifty mandays per hectare per year over the project's duration while fertilizer application required only two mandays per hectare per year. The number of days required for fertilizer application and the quantity of fertilizer appeared to be compatible with requirements for other enterprises except those for improved method for millet cultivation.

Table 3.11:   (Cotton) Improved Method (1.0 hectare)

Physical	Unit	Project Year			
		1	2	3	4-20
Output	kg	1000	1000	1000	17,000
Inputs					
Labor:	mandays	262	212	212	3,604
Landclearing		50	–	–	–
Land preparation		50	50	50	850
Fertilizer application		2	2	2	34
Planting		20	20	20	340
Weeding		40	40	40	680
Harvesting		100	100	100	1,700
Seed	kg	70	70	70	1,190
Fertilizer:	kg				
15:15:15		125	125	125	2,125
Sulphate of ammonia		125	125	125	2,125
Seed dressing	gm	210	210	210	3,570
Storage chemical	gm				
Tools and others	nos.				
Hoe		1	–	1	8
Sickle		1	–	1	8
Sack		5	–	5	40

Source: Ministry of Agriculture; Ghana Agricultural Sector Review

Planting required twenty mandays of labor per hectare per year while weeding required forty mandays per hectare per year. Because of the estimated increase in yield from five hundred to one thousand it was also estimated that labor requirements for harvesting will increase to one hundred mandays per hectare per year. Seed requirements remained unchanged at seventy kilos per hectare per year over the life of the project. One hundred and twenty five kilos of sulfate of ammonia fertilizer was required per hectare per year and the same quantity was required of 15:15:15 fertilizer. The seeds were treated with seed dressing of which two hundred and ten grams were required per hectare per year. A hoe and a sickle were required every other year while five sacks were required every two years to bag the output.

Table 3.12 refers to the irrigated method of cotton cultivation. The estimated output per hectare per year for this enterprise is fifteen hundred kilos. The input side shows a very significant decrease in the number of mandays required per year. This is due to the fact that many of the activities are undertaken by government operated facilites. Specifically, landclearing, land preparation, fertilizer application, planting, irrigation and harvesting are all undertaken by government operated machinery. Each of these services performed carries with it a lump sum service charge of two hundred and sixty five cedis per hectare per year. Labor input is therefore accounted for in the

Table 3.12: (Cotton) Irrigated Method (1.0 hectare)

Physical	Unit	Project Year			
		1	2	3	4-20
Output	kg	1500	1500	1500	25,500
Inputs					
Labor:	manday	30	30	30	510
Landclearing		-	-	-	-
Landpreparation		-	-	-	-
Fertilizer application		-	-	-	-
Planting		-	-	-	-
Irrigation		-	-	-	-
Weeding		30	30	30	510
Harvesting		-	-	-	-
Seed	kg	90	90	90	1,530
Fertilizer:	kg				
15:15:15		250	250	250	4,250
Sulphate of ammonia		250	250	250	4,250
Seed dressing	gm	270	270	270	4,590
Tools and others	nos.				
Hoe		1	-	1	8
Sickle		1	-	1	8
Sack		8	-	8	64

Source: Ministry of Agriculture; Ghana Agricultural Sector Review

performance of these services. The only easily identifiable labor activity is weeding which required thirty mandays per hectare per year. Seed requirements were ninety kilos per hectare per year. The seeds were treated with dressing of which two hundred and seventy grams were required per hectare per year. Ferilizer was applied and this required two hundred and fifty kilos of 15:15:15 and the same quantity of sulfate of ammonia per hectare per year. One hoe and one sickle were required per hectare per year and per every other year while eight sacks were required to bag the output.

Table 3.13 refers to the traditional method of groundnut cultivation. The estimated output per hectare per year was eight hundred kilos. On the input side one hundred and sixty mandays of labor per hectare were needed in the first year. This number decreased to one hundred and ten mandays per hectare per year over the remaining nineteen years because landclearing, which by itself required fifty mandays per hectare in the first year of the project, was not an activity needed in the remaining years of the project's duration. Twenty mandays of labor were required per hectare per year for planting. No fertilizer was applied under this method. Weeding requited forty mandays per hectare per year over the project's duration while the activities of harvesting, and dehusking and shelling each required twenty five mandays of labor per hectare per year. Eighty kilos of seed were

Table 3.13: (Groundnut) Traditional Method (1.0 hectare)

Physical	Unit	Project Year			
		1	2	3	4-20
Output	kg	800	800	800	13,600
Inputs					
Labor:	mandays	160	110	110	1,870
Landclearing		50	-	-	-
Planting		20	20	20	340
Fertilizer application		-	-	-	-
Weeding		40	40	40	680
Harvesting		25	25	25	425
Dehusking and shelling		25	25	25	425
Seed	kg	80	80	80	1,360
Seed dressing	gm	-	-	-	-
Fertilizer:					
15:15:15	gm	-	-	-	-
Sulphate of ammonia	gm	-	-	-	-
Tools and others	nos.				
Hoe		1	-	1	8
Sickle		1	-	1	8
Sack		4	-	4	32

Source: Ministry of Agriculture; Ghana Agricultural Sector Review

required per hectare per year for planting. One hoe and one sickle were required in the first year and every other year while four sacks were needed to bag the output. Each sack had a lifespan of two years. It can be seen that no requirements were made for land preparation. This is due to the fact that the process of harvesting groundnut is such that by the time the harvesting is over the land is ready for use.

Table 3.14 refers to the improved method of groundnut cultivation. The estimated output per hectare per year was fifteen hundred kilos over the project's duration. On the input side two hundred and fifteen mandays of labor were required per hectare in the first year. This total labor requirement decreased to one hundred and sixty five mandays per hectare per year over the next nineteen years. The reduction in labor requirement is attributable to the satisfaction of the requirement for land clearing which took place only in the first year and utilized fifty mandays of labor. Planting required twenty mandays per hectare per year over the project's duration while fertilizer application utilized fifteen mandays per hectare per year. This requirement differed from the requirement for the other enterprises which ranged from two mandays to five mandays except where a lump sum charge applied for the use of government operated machinery. Weeding required forty mandays per hectare per year over the project's duration. There was an increase in the number of

Table 3.14: (Groundnut) Improved Method (1.0 hectare)

Physical	Unit	Project Year			
		1	2	3	4-20
Output	kg	1500	1500	1500	25,500
Inputs					
Labor:	mandays	215	165	165	2,805
Landclearing		50	–	–	–
Planting		20	20	20	340
Fertilizer application		15	15	15	255
Weeding		40	40	40	680
Harvesting		45	45	45	765
Dehusking & shelling		45	45	45	765
Seed	kg	90	90	90	1,530
Seed dressing	gm	200	200	200	3,400
Fertilizer:					
15:15:15	gm	120	120	120	2,040
Sulphate of ammonia	gm	120	120	120	2,040
Tools and others	nos.				
Hoe		1	–	1	8
Sickle		1	–	1	8
Sack		8	–	8	64

Source: Ministry of Agriculture; Ghana Agricultural Sector Review

mandays required for harvesting form twenty five (traditional) to forty five because of the expected increase in output. Dehusking and shelling also required forty five mandays of labor per hectare per year over the duration of the project. Ninety kilos of seed were required for planting each year and these seeds were treated with two hundred grams of seed dressing. One hundred and twenty kilos of sulfate of ammonia and the same quantity of 15:15:15 fertilizer were applied per hectare per year. One hoe, one sickle and eight sacks were required in the first year and every other year.

The corresponding revenue and cost tables for these physical output and input tables will be presented in the analysis. It will be shown that not all of these enterprises were profitable. Their inclusion in the project's design thus affected the net worth of the project. An alternative design would have deleted these unprofitable enterprises and increased the acreage for the profitable enterprises thereby reducing wastage of resources while at the same time increasing the effectiveness of the budget.

3.4 ADMINISTRATIVE DATA

There is one administrative unit for the crop project. The administrative data have two parts: the foreign exchange component and the local component. The assumption underlying this dichotomy according to the Ministry of Finance and Economic Planning representatives

is that generally about 90% of expenditure on buildings, plants, vehicles, and their operation and physical contigencies require foreign exchange while 10% is in local currency. Salaries and allowances and general administration did not have andy foreign component. Foreign participation was by way of the World Bank.

Table 3.15 showing the foreign exchange component of the administrative data was arrived at by applying the shadow exchange rate. The estimation of this shadow exchange rate will be discussed under methods and concepts. Buildings under Table 3.15 refer to office buildings and storage depots. Plants, vehicles, equipment refer to machinery for irrigation, pumps, office equipment, tractors and cars. Plant and vehicle operation refers to maintenance of the machinery, spare parts, fuel, and other operating expenses. Physical contigencies refer to appropriations that are necessary to restore facilites that may be destroyed by weather events such as harmattan and bush fires.

Upon reading this discussion one would find that no numbers for specific items have been stated. That in general is how the government operates. Funds are allocated lump sum and expended thus creating an avenue for misappropriation. The foreign exchange component table also shows that the total expenditures for the years 4-20 are small relative to the first years. This is because the bulk of the expenditures are in the first 3 years during

Table 3.15: Foreign Exchange Component (cedis)

	Yr 1	Yr 2	Yr 3	Yrs 4-20
Buildings	7,416,675	5,474,700	2,984,625	0
Plants, vehicles, equipment	9,842,175	2,370,375	378,000	603,225
Plant and vehicle operation	702,450	1,975,050	2,102,625	1,523,025
Physical contingencies	1,020,600	623,700	420,525	144,900

Source: Ministry of Agriculture; Ghana Agricultural Sector Review

which the government maintained an active part in the 1
project. In the years 4-20 the government's attention is
focussed on plant and vehicle operation because it is
expected that repair and maintenance of vehicles and
plants will have to be undertaken.

Table 3.16 shows the other 10% of the administrative
data and follows generally the same trend. The funds in
this table were also appropriated lump sum. Salaries and
allowances for the first 3 years are expenditures incurred
for projec officers as well as for extension officers.
However, during the years 4-20 where the project would
have reverted to the participants, salaries and allowances
are expended mostly on extension officers and their
activities.

Table 3.16: Local Currency Component (cedis)

	Yr 1	Yr 2	Yr 3	Yrs 4-20
Buildings	470,900	347,600	189,500	0
Plants, vehicles, equipment	624,900	150,500	24,000	38,300
Salaries, allowances	1,487,000	1,730,000	1,840,000	482,000
Plant and vehicle operation	44,600	125,400	133,500	96,700
General administration	65,000	43,000	25,000	0
Physical contingencies	64,800	39,600	26,700	9,200

Source: Ministry of Agriculture; Ghana Agricultural Sector Review

CHAPTER 4

METHODS AND CONCEPTS

4.1. METHOD

I have discussed the farm models as well as the administrative data but before I go on to the analysis I have to discuss the methods and concepts that will enable me to carry out a successful analysis. There are a number of methods available for project analysis but that of interest to me is the NET PRESENT WORTH (also known as net present value). This is the method that will be used mostly because it is the most straightforward discounted cash flow measure of project worth, the method with the least inconsistencies, and that most universally accepted by analysts.

The net present worth method can be mathematically stated as

$$NPW = \sum_{t=1}^{20} \frac{Bt-Ct}{(1+i)} \, t$$

where NPW is net present worth, Bt is benefits, Ct is costs and i is the discount rate.

4.2. VALUATION OF COSTS AND BENEFITS

Costs are anything that lessen the value of the objective while benefits add to fulfillment of the objectives. In this instance benefits are expected to be the increase in output. This immediate benefit· is straightforward and easily defined. Since this is an economic analysis there are other benefits which are not easily defined but nonetheless have to be mentioned such as improved farming techniques that the project will bring to the area, the downward pressure that increased output will exert on crop prices in general (Turtiainen and Pischke, 1986). To evaluate these increases in output requires that economic prices be used. Economic prices differ from financial prices especially in Ghana where the government through the Prices and Incomes Board administers prices irrespective of market forces. Since a lot of trading (smuggling) occurs between Ghana and her neighbors especially at the border towns, border prices minus transportation cost can be used as economic prices which to a greater extent represent society's opportunity cost. These transportations costs are, however, relatively small because the project's locations are all border areas.

These economic prices become relevant when the absence of competition makes officially fixed farm gate prices unreliable measures of output value. These economic prices derived from border prices however, do function as real prices since they are based on prices prevailing in

neighboring countries.   Since   smuggling of farm produce to neighboring countries   like Ivory Coast and Togo persist in the face of costly consequences upon apprehension it is not inaccurate to say that these prices are a better measure of market prices than the farm gate prices.   Based upon these prices, we will use real prices which do not take inflation into account.   That is, the price level at the time of the project's inception is assumed to apply continuously.   The assumption is that inflation will affect all prices (both costs and benefits) to the same extent so that prices will retain their general relations (Gittinger, p.   76).   Using these constant 1976 prices to estimate costs and benefits will enable interested observers and the analyst to judge the effects of the project on the incomes of participants and its income-generating potential for society as a whole. By using these constant prices the absolute or in this case money values of costs and benefits will be incorrect but the relationship between costs and benefits will still remain valid because they are subjected to the same treatment.   It is worth noting that the changes in the administrative costs over at least the first three years should not be attributed to inflation, but to changes in volume of such inputs or services.

In Table 4.1 the prices of the crops that will be used in calculating benefits are being shown. These are 1976 real prices (cedis).   I am using 1976 prices because this was the year of the project's inception.

Table 4.1. Other Prices

Crop	Price/metric ton	Price/kg
Rice	463	.46
Millet	259	.26
Groundnut	413	.41
Cotton	256	.26

Source: Ghana Agricultural Sector Review: Annex 4, p. 62.

These prices per metric ton are quoted in cedis while the prices per kilo are quoted in decimals of a cedi. These can be read also in pesewas which are subdivisions of the cedi. One hundred pesewas equal one cedi so .46 of a cedi can also be read as 46 pesewas.

Rice was sold at c463 per tonne (metric ton) and c.46 kilo (46 pesewas per kilo) wholesale. Millet fetched c259/tonne and 26 pesewas/kilo while groundnut fetched c413/tonne and 41 pesewas/kilo. Cotton also fetched c256/tonne and 26 pesewas/kilo.

Cost is a sacrifice that must be made in order to do or acquire something and to most of us the concept of cost that readily comes to mind is what we may call outlay costs. These are the funds expended in order to carry on a particular activity or project (Milton Spencer, 1983). However, there is a more basic concept of cost which economists call opportunity cost.   This can be defined as the value of the benefit forgone by choosing one alternative rather than another.   It measures the real cost of an activity.   In project analysis we can simplify this by saying that cost is anything that subtracts from the objectives. To get the costs for the farm models we have to multiply the physical inputs by their appropriate prices.

4.3. LABOR

Apart from the costs incurred on plants, vehicles, buildings, etc., the major on-farm costs are incurred on labor thus making the valuation of labor an important issue. Theories about shadow wage computations in developing countries are usually based on the assumption that such economies have an overabundance of labor in relation to demand. The shadow wage rates that are computed are used to determine socially desirable levels of employment. A prominent proponent of the surplus labor model is Arthur Lewis who argues that labor becomes available to industry at the subsistence wage thus permitting the generation of surplus for further investment. In order for Lewis' model to hold there is among others the assumption that the subsistence wage is fixed according to labor productivity in terms of food production. However, by using economic theory we can criticize this assumption. It is likely that as more and more labor moves from the land to industry after a point any further migration of labor will reduce marginal productivity. To avoid this reduction, labor will have to be paid above the subsistence level in order to retain it on the land. Given this possibility the opportunity cost of labor will not be zero in the long run and may even be higher than the subsistence wage level.

In public project analysis the opportunity cost of labor will be defined as the highest alternative social value to be forgone by switching labor from its current uses

to the project. The implication is that in order for the net social benefit of the project to be positive the project must yield social benefit in excess of any alternative social benefits that might be produced with the inputs. In deriving the opportunity cost of labor for the project it is important that we do not ignore movement costs and occupational preferences. There is also the implication that labor and other inputs should not be used on a public project that produces a social value lower than what these inputs would produce if used on an existing public project. If there are no political constraints, however, then labor and other inputs should be used so long as there is a potential Pareto improvement over the existing situation.

Can we measure the social cost of using additional units of labor for the project by the price at which labor is bought? According to Sugden and Williams (1981, p. 102-104) the price of labor measures the amount that is necessary to pay to compensate additional or marginal workers for giving up their leisure to work. This price also measures the value of the extra output that would result from hiring the labor (value of marginal product). In a purely competitive economy, this price of labor measures the marginal social cost of using an additional unit of labor and this will be equal to the value marginal product. However, the significance of the market price of labor as a measure of the social cost and social value depends on how freely market transactions are conducted.

Problems arise in cost-benefit analysis when constraints in the market prevent supply and demand from reaching equilibrium. Given the presence of the Trades Union Congress in Ghana the market mechanism is not able to bid down wages despite high unemployment, thus the prevailing price of labor is not an accurate reflection of the opportunity cost of labor.

Since the shadow wage rate aims at measuring the opportunity cost of labor, we can argue that with the prevalence of high unemployment the shadow wage rate would be zero and not the market wage that is actually being paid. But should this hold? Not necessarily, because seasonal fluctuations in labor demand, varying degrees of labor mobility all cast doubts on this conclusion. In addition the creation of one additional job in the city may cause several rural laborers to migrate to the city thus making the forgone output the multiple of one worker's marginal product (assuming that marginal product is positive). It is also likely that where there are variations in skills, times, and locations there will be more than one shadow wage rate thus average shadow wage rates may not be a true reflection of the total cost of labor to society for using labor on the project. The inception of a project that increases labor incomes may lead to increased consumption when the marginal propensity to consume is high. Some will argue that the increase in consumption should be regarded as a cost and added to the shadow wage rates because increased

consumption reduces savings and consequently increases the cost of capital. There are a number of other factors that may invalidate the shadow wage rates. The project may create additional employment and likely increase the incomes of the poorest of the society. If reduction of poverty is a priority then it is necessary that the shadow wage rate be lower. People may also prefer to stay unemployed than to work at low pay depending on their income situation, value of leisure, leisure activities, and pleasantness or otherwise of the available job. Unemployed labor may prefer staying unemployed to being employed below a reservation wage. In this latter case the shadow wage may have to be higher than that indicated by a narrow interpretation of the opportunity cost of labor.

While agreeing generally with the discussion above Gittinger (1982, p. 258-263) notes that even in labor abundant societies there are probably peak seasons at planting and harvesting when most rural workers can find employment. At those seasons the market wage paid to rural labor is probably a pretty good estimate of its opportunity cost and its marginal value product and we could therefore accept the market wage as the economic value of the rural labor. He argues, however, that because in most instances the marginal product of such labor is negligible we can consider the opportunity cost of using this labor on the project to be close to zero. In many developing countries however, there can be pressure on prosperous farmers to be

generous with their less fortunate neighbors thus making rural wages higher than the marginal value product. Imperfect markets often exist in rural areas especially during slack agricultural seasons and frequently the market wage will be above the supply price of labor (that is the wage at which labor is willing to work), implying that labor surplus exists (Squire & Van Der Tak, p. 79). Output forgone in employing workers from this area is less than the market wage here but is not necessarily zero. While in theory the worker may be unemployed, he may in practice occupy himself with some form of self employment such as house repair and hunting. It is also natural to assume that it still requires resources for an unemployed laborer to merely exist and these resources obviously have some positive value. Also those workers who migrate from Upper Volta (Burkina Fasso) to the project area in search of jobs do have to bear some costs at least for transportation.

It is not surprising that almost all economists now agree that the marginal value product of agricultural labor on an annual basis worldwide is more than zero so that in every instance our opportunity cost of labor will be positive even though it may still be very low. We have in principle agreed that labor should be valued at its opportunity cost but the problem, as Schmid (p. 160-167) indicates, is whose opportunity cost is to count. Schmid distinguishes between cyclical and structural or regional unemployment and their effects on wages. In situations of

cyclical unemployment should wages be allowed to decline to a new full employment equilibrium? Is this possible in the presence of labor unions and politics? Government action and objectives will determine what wage rate should be used as the opportunity cost of labor. In the words of Schmid, "if government chooses to trade-off full use of the economy's labor in the pursuit of other objectives it would not make sense to have public inputs priced below nominal costs (1983, p. 162)."

Agreeing on the principle of opportunity cost as the optimum valuation of labor does not solve the problem entirely because there arises the question of what data reflects the true opportunity cost. Should the market wage be the opportunity cost of unemployed labor? Or should the shadow wage for the unemployed be below the going market wage? How do we value what they did before the project? Should this valuation be the same for those who had neither income nor savings and those who did? Or should the preferences of third parties suffering negative externalities of unemployment be taken into account? If we do and their willingness to pay to reduce or remove unemployment is high, would that not render costly such projects and make them unprofitable? There may be pockets of unemployment even in times of full employment due to short term labor immobility, transactions costs and asset fixity. How then do we price these unemployed laborers?

In Ghana, as in most developing countries, skilled labor is in short supply and would most likely be fully employed even without the project being considered. But since the government fixes the wages paid to workers such as mechanics, foremen, project managers, accountants and others, it is likely that these wages would not represent the true marginal value product of these workers. In fact these officially fixed wages do undervalue skilled labor including extension officers. Having said this I however want to say that since unskilled labor is often overvalued it is possible to assume that these two situations will come close to reconciling each other and thus it would not be wrong to take the nominal wages of skilled and unskilled labor given as the true opportunity costs of labor in analyzing the project. We know the salaries for skilled labor is given in the salaries and allowances under the administrative data and we are going to assume that the figures are correct. As regards unskilled labor the minimum wage per day was fixed and the average monthly earnings are about c52 (fifty two cedis) based on the minimum daily wage of c2 (two cedis) set by the government in 1976 which usually applies to workers hired by the day. These are casual laborers and thus do not qualify for cost of living allowances, transportation allowances, rent allowances and allowance in lieu of canteen services, that are applicable to permanent laborers. They work an average of twenty six days a month and earn about c2 (two cedis) a day. Child

labor on the other hand receives less because the government does not recognize it and consequently does not control its earnings. The farmers themselves set the wage which is usually at about 80% of the adult wage (this is arbitrary). Child labor which is used mostly for scaring away birds also does not qualify for rent allowance, transportation allowance, cost of living allowance and canteen allowance thus earning an effective minimum wage of only c1.60. This disparity can be explained by the fact that the children work far fewer hours just to scare the birds away from destroying the rice crop. Adult labor includes family labor which is not represented on the farm input structures. This family labor works an average of 8 hours a day and since this contribution is not included in the input structure, the wage that would otherwise be earned is regarded as a benefit or a return and added to total benefits. At 8 hours a day family labor accounts for about 121.67 mandays thus leading to an effective net return of c243.33 per year (Gittinger, p. 259).

4.4. DISCOUNT RATE

Theoretically using too low a rate of interest to discount social profits would lead the economy to attempt to invest too much creating inflationary effects, while too high a rate could leave savings unutilized and cause excessive unemployment. It is necessary therefore to maintain some kind of balance between investment and

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investible resources. It is convenient to use a single discount rate in order to avoid problems of comparison and ranking (Little and Mirrlees, 1974, p. 291). Harberger in "Project Evaluation" (1975, p. 72) argues that the discount rate should be equal to the marginal productivity of capital.

The discount rate provides the link between different time periods and allows all costs and benefits to be expressed in present value. In similar fashion Squire and van der Tak (1981, p. 76) argue that if the discount rate is set too high too few projects will pass the test of a positive net present value and there will be an excess supply of public investment funds. They add to Harberger's argument by saying that the discount rate should be equal to the marginal productivity of capital minus distributional impact. Both arguments are sound, but unlikely to work in Ghana because of problems in measuring the marginal productivity of capital.

Sugden and Williams (1978, p. 211-228) consider two alternative approaches to the choice of a social discount rate. One approach is based on the pursuit of consistency between decision-making in the public and in the private sectors, and the other is based on the concept of 'social time preference'. To achieve consistency and efficiency in project appraisal the social discount rate used in appraising public projects must be consistent with that used in appraising private projects. If there is any

inconsistency then it will be possible to reallocate resources in order to attain an increase in social welfare. Consistency requires that projects with the same time streams of social costs and benefits should be treated in the same way whether they are proposed in the public or in the private sectors. The other approach based on the concept of social time preference recognizes society's preferences between consumption in different time periods. Under this approach the social marginal time preference rate is used as the discount rate for discounting the costs and benefits of public projects. However, this approach would lead to different outcomes from those implied by the consistency approach unless the social marginal time preference rate was equal to the private sector's implicit social discount rate. It is however idealistic to suggest that the private sector's implicit social discount rate would equal the social marginal time preference rate. There are problems with the concept of social marginal time preference rate since it involves choice between periods and between generations. In using this we very often will be using the time preference of present generations over those of the unborn and in inflation prone Ghana we can expect the social marginal time preference rate to be very high and thus very little investment and too much consumption based on the fear of expected increases in prices and erosion of purchasing power.

Probably the best discount rate to use is the opportunity cost of capital. This is the rate that will result in utilization of all capital in the economy if all possible investments are undertaken that yield that much or more return (Gittinger, 1982, p. 314-315). Accordingly, the rate would reflect the choice made by the society as a whole between present and future returns and hence the amount of total income the society is willing to save if this rate is set perfectly. But does anybody really know what the opportunity cost of capital is? Conventionally any rate between 8 and 15 percent in real terms has been used with 12 percent being the most frequently used in developing countries. If the country decides to use the borrowing rate it pays to finance the project as the discount rate, the result will be influenced by the financial terms available and will not be based solely on the relative contribution of projects to national income. The social time preference rate which is sometimes proposed creates problems of allocation both in theory and in application since it differs from the opportunity cost of capital in that the opportunity cost of capital derives from both public and private investment activities and gives the same weight to future returns from both kinds of activities.

From the foregoing discussion it is evident that choosing the discount rate for project analysis especially in developing countries is not a foregone conclusion. Ultimately, it may simply be a matter of convention rather

than theory. How are interest rates determined? In many developing countries most interest rates are not market rates. Instead these rates are either set by the government or reflect such statutory ceilings or floors, thus any movement in interest rates is principally the movement of government administered interest rates (Hanson and Neal, 1986, p. 18-21). May I point out, however, that government intervention is not exclusive to developing countries. In developed countries government intervention is also significantly pervasive. Reserve requirements as well as taxes affect rates of interest in all countries, and controls are often placed on interest rates. Even the United States financial system, which is among the most market oriented, had been subjected to Regulation Q establishing ceilings on interest rates paid on many important classes of deposits until 1983. The relevant point, however, is the impact of the intervention and not its existence. Competitive financial markets would establish nominal interest rates on deposits that are positive in real terms because savers must be induced to hold financial rather than real assets, and, on average real assets grow in nominal terms at the rate of inflation. Thus the nominal deposit interest rate must equal the expected inflation rate plus a small underlying real rate (rate that provides an incentive to hold financial assets). Lending rates will also be positive in real terms to cover cost of deposits (rate paid to depositors) and a margin for risk,

taxes, overhead, reserve requirements and administrative costs. The above is Fisher's theorem, but in using this theorem real interest rates in Ghana will be negative since nominal interest rates during the period 1970-1980 were below 12 percent while the rate of inflation was approximately 34.8 percent. This theorem is thus not appropriate. Recent theory predicts that nominal interest rates on domestic assets will equal world interest rates adjusted for expected rates of devaluation and risks based upon the fluidity of international capital flows. Suppose expectations of a larger devaluation develop because of expansionary monetary and fiscal policy or a decline in export prices, ensuing capital outflows would raise interest rates until marginal asset holders became indifferent between foreign and local currency assets (Hanson and Neal, p. 19). Once again this presumes the existence of a capital market or a developed financial system. Without a strong economy there can be no confidence in Ghana's economy so the fluidity in international capital flows does not apply.

Since independence the government of Ghana like those of other developing countries adopted policies of low and controlled interest rates and credit rationing. Some of the reasons for these policies were: (a) a desire to keep down the costs of servicing public sector debts, (b) the suspicion that free markets charge usurious rates that are harmful for smaller borrowers, (c) the belief that without lower interest rates, investment would not be adequate

enough to accelerate growth, (d) the concern that higher interest rates are inflationary through their effects on costs, and (e) the "second best" argument for offsetting other distortions in the economy, for example, low agricultural prices.

As inflation accelerated from under 10% in the 1960s to above 30 percent in the 1970s in Ghana the policy of low and relatively stable nominal interest rates became increasingly untenable. Since this situation indicated negative interest rates savers suffered losses in real income and were thus encouraged to hold assets in real estate, consumer durables, currency, and when possible in foreign currency deposits. With local savings reduced and foreign exchange unavailable credit had to be rationed. The above situation also meant a reduction in the real cost of capital thereby permitting unprofitable investments and excessive capital intensity which in turn lowered the average efficiency of investment. Even in equity terms it led to a transfer of income from low income savers to borrowers who were mostly of the high income group. In Table 4.2 various interest rates are shown to highlight what has been discussed about their effect on savings and investment. From Table 4.2 the highest lending rate in 1977 was 10 percent. Given an average rate of inflation over 30 percent the real interest rate is thus negative. But this situation does not apply to only Ghana. A lot of developing countries with similar characteristics

Table 4.2. Interest Rates (percent)

	1970	1973	1974	1975	1976	1977
Central bank:						
Rate on government stocks						
from	4.00	3.50	3.50	5.00	5.00	5.00
to	6.50	8.00	8.00	8.00	8.00	8.00
Treasury bill rate	4.00	5.25	5.25	7.75	7.75	7.75
Bank rate	5.50	6.00	6.00	8.00	8.00	8.00
Commercial bank rates:						
Borrowing rates						
3 months	7.50	5.125	7.750	7.625	7.625	7.625
6 months	2.75	5.750	5.375	7.875	7.875	7.875
12 months	3.50	5.500	5.500	8.000	8.000	8.000
Saving deposits	2.50	6.500	5.000	7.500	7.500	7.500
First Ghana Building Society						
Savings rate from	8.500	5.000	5.000	5.000	5.000	5.000
to	8.500	6.500	6.500	5.500	5.500	5.000
Lending rate	9.000	10.000	10.000	10.000	10.000	10.000

Source: Bank of Ghana. Reproduced in World Bank Country Study –
Ghana, p. 152.

also encounter the same problems. Thirty one developing countries were studied for the effect of price distortions on growth and the results indicated negative real interest rates for all of the countries except Ethiopia. In Table 4.3 a sample of these countries are listed for illustration.

Table 4.3 shows the degree of distortion in the cost of credit in the 1970s as indicated by the negative real interest rates. In most of the countries savers lost at least 10 percent a year in real terms on the average for the decade. These real interest rates were particularly lower for the countries of Latin America. These negative rates were not deliberate policy decisions, but rather the consequences of high inflation rates which could not be reflected in interest rates (Agarwala, p. 22).

The financial sector in Ghana is not well developed and to a large extent market forces play no role at all in the financial system. There is extreme government intervention in the economy with the government owning commercial banks as well as having joint ownership in others; the same situation applies to pension funds and an insurance company which provides the government with extensive direct control over credit allocation. These control mechanisms include specified lending rates for agricultural credit and specific instructions to honor agricultural borrowers. As already discussed, there are minimum interest rates on deposits and maximum lending rates which are all fixed by the government.

Table 4.3. Movements in Real Interest Rates, 1970-80 (% per annum)

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	Interest rate	Infla- tion	Real interest rate
Malawi	6.0	6.0	6.0	6.0	6.0	7.0	7.0	7.0	8.0	10.0	6.1	9.8	-3.4
Ghana	8.0	8.0	6.0	6.0	8.0	8.0	8.0	13.5	13.5	13.5	9.4	34.8	-19.0
Ivory Coast	3.5	3.5	5.5	5.5	8.0	8.0	8.0	8.0	8.0	10.5	6.9	13.2	-5.5
Nigeria	4.5	4.5	4.5	4.5	3.5	3.5	4.0	5.0	-	6.0	4.4	18.2	-11.7
Senegal	3.5	3.5	3.5	5.5	8.0	8.0	8.0	8.0	8.0	10.5	6.9	7.6	-1.0
Bangladesh	-	5.0	5.0	6.75	8.0	8.0	8.0	8.0	8.0	8.63	7.3	20.3	-10.9
Pakistan	5.0	6.0	8.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0	8.6	13.5	-4.3
Argentina	13.0	19.6	19.3	16.7	20.3	56.0	116.2	130.4	117.1	79.4	58.8	130.8	-31.2
Brazil	20.0	20.0	18.0	18.0	18.0	28.0	30.0	33.0	35.0	38.0	25.8	36.7	-8.0
Chile	18.0	21.0	48.0	136.0	268.0	197.0	94.5	63.8	45.1	-	99.0	224.1	-38.6
Columbia	14.0	14.0	14.0	16.0	16.0	20.0	20.0	22.0	30.0	30.0	19.6	22.0	-2.0

Source: Adapted from Table 7 (p. 23) in Price Distortions and Growth in Developing Countries by Rangopal Agarwala.

The government borrows a lot to finance the relatively large budget deficits and also to subsidize the parastatal enterprises. Other methods not exclusive to Ghana but which were also used are the traditional measures like reserve requirements and liquidity requirements. The government also regulates the portfolio composition of the financial institutions by regulating the share of deposits committed to agricultural lending and the share held as low yielding government securities. The government apart from subsidizing the parastatals also goes further and guarantees credit extended to these parastatals, and places restrictions on foreign owned enterprises access to domestic credit.

The effects of these interventions are two fold:

(1) They prevent intermediaries from charging a premium to cover the additional costs and risks of term finance and of lending to smaller borrowers and those with little collateral.

(2) They limit the interest rates payable on deposits, thereby suppressing the mobilization of financial savings and thus limit loanable funds.

The extensive borrowing by the government to finance the budget deficit has also placed a strain on the growth potential of the country by reallocating resources towards the public sector mainly for the payment of salaries and allowances. Since the government itself owes a lot it is unlikely that interest rates will be reformed upwards since

that would raise government debt service and place more pressure on the deficit. Introduction of reforms could compel the government to resort to inflationary finance, increased forced holding of government securities or a reduction in public expenditures to reduce the deficit. Given the above distortions in the interest rates and a negative real interest rate of -19 percent, what rate can be applied for discounting purposes? Conventionally, 12 percent to 15 percent has been used as the discount rate for developing countries in similar situations, but using a rate of 12 percent for Ghana, as was done, underestimates the lack of financial resources. Using 15 percent would in my opinion highlight the severity of the dearth in financial resources and perhaps put pressure on the government to allow direct interplay of market forces. Thus 15 percent (the highest of the conventional rates) would be the discount rate to be used in the analysis.

4.5. PRICE OF FOREIGN EXCHANGE

Using a high shadow price of foreign exchange will penalize projects intensive in imported inputs and favor import substituting and export oriented investments (Lance Taylor, p. 198). In a world of freely floating exchange rates, speculation could drive down the value of domestic currency relative to foreign currencies to the exchange rate that speculators expect to attain. This exchange rate then sets the true social price of foreign currency and as long as all imports are valued at this exchange rate their true

social cost may be reflected (Gramlich, p. 67-68). However, in Ghana where the exchange rates are fixed and the government continuously intervenes in the currency markets, problems do emerge and it becomes more difficult to figure out the relevant shadow price. By not allowing the market system to set exchange rates the government is forced to set quotas to ration the available foreign currency thus thwarting the use of market prices as opportunity costs (Schmid, p. 154-155). The government consistently sets official exchange rates, despite their adverse effects, to protect consumption by the poor and also to allow the importation of certain goods that are deemed necessary for development but which could not be imported at a floating rate.

The Upper Region Agricultural Development Project requires that foreign exchange be used to purchase vehicles, plants and other equipment. According to Sugden and Williams (1978, p. 100-102), it will be convenient to regard this foreign currency as an input to the project. This foreign currency has a price expressed in terms of the exchange rate which subjects the foreign currency system in the free market place to the laws of supply and demand. That is, in a free market system the price, or in this case the exchange rate, gives an idea of the marginal valuation of foreign currency. But in Ghana the price of foreign currency is not determined by free market forces, thus inhibiting the derivation of the marginal social value.

Given such a situation a shadow or accounting price should be used. According to Sugden and Williams governments sometimes impose taxes on the use of foreign currency such that the gross cost equals the optimal shadow price. On the other hand, imports can be taxed to achieve the same goal. Sugden and Williams however did not elaborate on what rate of taxes and the reasoning underlying the choice of any particular rate.

Agarwala (1985, p. 18-21) describes the exchange rate as the key variable affecting the relation between domestic and foreign prices and, if properly set, could be the most effective instrument for simultaneously promoting exports and saving imports in an efficient manner without burdening the administrative system. However, exchange rates have not been properly set in a number of developing countries. Their rigidity have created problems for countries like Ghana, Nigeria, Bolivia and Argentina to mention only a few. Distortions in the exchange rate system became eminent following the oil crises in the early and late 1970s. Agarwala in his statistical analysis shows a strong correlation between exchange rate distortions and growth performances.

The distortion in the exchange rate system in Ghana is so high that a study conducted by Ernesto May (World Bank) on "Exchange Controls and Paralleled Market Economics in Sub-Saharan Africa" focussed on Ghana. As pointed out by May (1985, p. 11) the government of Ghana often resorts to

import restrictions   rather than devaluation or restrictive monetary and fiscal   policies to conserve foreign exchange as a way of dealing with   foreign exchange scarcity.

Table 4.4 shows the real effective exchange rate indices for   Ghana and some selected Sub-Saharan African countries.   As can be   seen Ghana had the highest increase in real effective exchange   rate, when compared with the increases for Ivory Coast and Togo.   Nigeria's effective exchange rate in 1973 and 1974 responded to   the increase in oil prices during this period. Liberia's   exchange rate index on the other hand stayed relatively stable   because the currency was tied to the United States dollar.

The table for the nominal effective exchange rate indices   (Table 4.5) also show that Ghana had the highest decline followed   by Zaire, with Ghana's neighbors Ivory Coast and Togo enjoying   relatively stable and similar indices as a result of their   currency's relationship with the French franc. The appreciation   in the real effective rate was influenced by the government's   need to offset relatively high domestic inflation rates by   imposing exchange   controls.   This   only   accentuated   the over valuation in the exchange rate. The over valuation in the   exchange rate led to extensive smuggling of various kinds of   products to Ghana's neighbors, particularly Ivory Coast and Togo.   Cocoa, the nation's most important foreign exchange earner, was   the crop that was most often smuggled because of the relatively   high prices that it fetched.

Table 4.4: Real Effective Exchange Rate Indices (1972-1980)

(Indices, 1972 = 100)

	1972	1973	1974	1975	1976	1977	1978	1979	1980
Ghana	100.0	115.64	124.11	139.76	212.67	415.53	467.49	347.68	454.88
Malawi	100.0	89.17	90.13	90.30	90.09	84.65	87.15	86.00	87.02
Nigeria	100.0	91.07	96.46	114.26	139.51	144.75	146.71	148.45	157.08
Sudan	100.0	103.24	113.94	122.88	122.43	129.50	124.70	131.87	121.34
Zaire	100.0	96.78	110.98	123.77	145.66	192.85	250.12	226.09	178.23
Liberia	100.0	102.55	108.68	108.26	109.16	104.88	98.34	98.07	100.29
Ivory Coast	100.0	105.37	106.01	109.31	109.50	124.93	130.61	140.00	142.78
Tago	100.0	99.11	94.87	105.57	103.98	111.78	104.0	103.59	102.49
Upper Volta	100.0	102.14	91.91	105.23	85.63	99.80	105.71	110.57	110.59

Source: Adapted from Exchange Controls and Parallel Market Economies
        in Sub-Saharan Africa (Table 2).

Table 4.5. Nominal Effective Exchange Rate Indices (1972-1980)

(Indices, 1972 = 100)

	1972	1973	1974	1975	1976	1977	1978	1979	1980
Ghana	100.0	106.22	109.15	107.65	115.17	113.78	79.30	41.71	40.76
Malawi	100.0	91.78	90.86	90.52	96.88	98.43	100.27	99.80	95.50
Nigeria	100.0	93.82	100.99	102.53	111.29	106.74	97.28	96.90	103.90
Sudan	100.0	99.56	101.84	103.21	112.63	113.79	99.45	89.14	75.88
Zaire	100.0	90.60	92.76	89.74	63.86	54.50	50.67	23.74	14.58
Liberia	100.0	93.07	93.76	92.03	96.15	94.27	87.49	84.70	84.08
Ivory Coast	100.0	102.13	99.05	103.06	100.88	98.73	98.83	99.52	99.47
Tago	100.0	103.21	98.87	104.99	101.80	98.67	98.96	100.71	99.99
Upper Volta	100.0	104.17	101.43	114.43	115.77	119.16	135.04	149.77	172.70

Source: Adapted from Exchange Controls and Parallel Market Economies
         in Sub-Saharan Africa (Table 3).

From Table 4.6 it is evident that cocoa smuggling increased over the time as production fell. Smuggling increased from a low 10,000 metric tons (2.33 percent of production) in 1960 to a high of 50,000 metric tons (18.87 percent of production) in 1978 and continues to increase. During the same period cocoa production fell from 430,000 metric tons in 1960 to 265,000 metric tons in 1978. The fall in output can be attributed to low officially fixed prices and unfavorable local terms of trade. At the same time the officially fixed exchange rate makes it lucrative for farmers and middlemen to smuggle cocoa output to the neighboring countries as illustrated by the trend.

A lot has been said about officially fixed exchange rates and how they do not reflect the opportunity cost of foreign currency, but so far we have not decided how to determine appropriate shadow exchange rates which will represent economic prices in the benefit cost analysis. To come up with shadow exchange rates, the financial accounts have to be adjusted. A well accepted method of doing this advanced by Gittinger (1982, p. 247-249) is the addition of a foreign exchange premium to the official exchange rate. But how do we determine the foreign-exchange premium ? Should we ask the central planning agency or should the analyst make his own estimate of this premium ? According to Gittinger, the planner usually does not know the premium. However, in Ghana, as in most developing countries, a special tax is usually levied on

Table 4.6: Cocoa Smuggling and Production

Ghana, 1960-1978 (thousand metric tons)

Year	Production	Quantity Smuggled	Percent of Production
1960	430	10	2.33
1961	409	8	1.96
1962	413	14	3.39
1963	428	11	2.57
1964	538	14	2.60
1865	401	17	4.23
1966	368	17	4.62
1967	415	21	5.06
1968	323	17	5.26
1969	403	25	6.20
1970	413	31	7.50
1971	454	37	8.15
1972	407	42	10.32
1973	340	34	10.00
1974	376	30	7.98
1975	396	38	9.60
1976	320	40	12.50
1977	271	45	16.60
1978	265	50	18.87

Source: Reproduced from Exchange Controls and
Parallel Market Economies in Sub-Saharan Africa
(Table 5, p. 69).

foreign exchange allocations   and this tax could serve as
the foreign exchange premium.   At the   time of the
project's inception and even before that, the   official
exchange rate was c1.15 to s1 but there was a tax of 75%
on foreign exchange allocations. Between February 1973 and
June 1978 the exchange rate was U.S. s1: c1.15. In August
1978 it was changed to U.S. s1: c2.75 and in October 1983
it was U.S. s1:   c30. Currently the rates stands at U.S.
s1: c90. It is worth noting that these changes are not a
result of the interplay of market forces, but the results
of government action in reacting to world market forces.
This has been described by the   government as a gradual
adjustment designed to bring some realism to the exchange
rate and it is expected that these adjustments   will
continue until all distortions are removed.

Going back to the project's inception, the shadow
exchange rate can be computed thus

SER = OER (1 + FX premium)

where

SER is shadow exchange rate

OER is official rate

FX is foreign exchange premium , and

SER = 1.15 × (1 + .75)

where

1.15 is the official exchange rate

and .75 is the premium representing the 75 percent

tax on foreign exchange allocations.

The shadow exchange rate is 2.0125. This number has been used to compute the cost of the various inputs that have foreign exchange components. It is important to note that this rate is merely an approximation of the shadow exchange rate it does not necessarily establish an equilibrium between the demand for and supply of foreign currency.

4.6 OTHER PRICES

Apart from labor, discount rate and foreign exchange there are other inputs that have to be listed.

It was assumed that hoe, sickle and sack each has a life span of 2 years. The government also charged c265/acre on government operated irrigated schemes, as well as a lump-sum fee of c265 for each of the following mechanization activities: landclearing, ploughing, land preparation, harrowing, bunding, sowing and fertilizing, and harvesting. In Table 4.7 the cost of other inputs are listed. The prices for the seeds are the same as listed in Table 4.1. Sulfate of ammonia costs fifty nine pesewas per kilo while 15:15:15 the other type of fertilizer costs forty-six pesewas per kilo. Seed dressing and storage chemical costs sixteen and twenty-four pesewas, respectively. A hoe costs eight cedis each while a sickle costs five cedis each. One sack also costs six cedis and fifty pesewas each.

Table 4.7: Cost of Other Inputs

Input	Unit	Price (¢s)
Seed: Rice	kg	.46
Millet		.26
Groundnut		.41
Cotton		.26
Fertilizer		
15:15:15	kg	.59
S. ammonia	kg	.46
Seed dressing	gm	.16
Storage chemical	gm	.24
Hoe	1	8.00
Sickle	1	5.00
Sack	1	6.50

Source: Ministry of Agriculture, World Bank
(Ghana Agric. Review)

4.7 LAND

Valuation of land is a problem for this particular project because the land that was brought into cultivation was previously not being utilized and therefore had an opportunity cost of zero. It is worth mentioning, however, that the project contributed to an influx of educated farmers from the south. These farmers migrated up north to take advantage of the irrigation facilities and other services available. Of course, one can argue that the latter is an ex-post effect and should rather be counted as external benefits and not as costs. These external benefits do not enter into the accounting of the participant farmers so in deriving the farm budgets it is appropriate to assume that the opportunity cost is zero and treat land as such.

CHAPTER 5

ANALYSIS AND RESULTS

5.1 ANALYSIS

The data have been presented in chapters three and four so the analysis of data becomes the logical next step. The net present worth method has been decided upon and the concepts underlying this method have been discussed.

Each farm model will be analyzed in terms of costs and benefits to arrive at farm profitability. This will be done in a tabulated form to allow for easy reading. The project's profitability will be arrived at by adding all costs (on farm and off farm) and subtracting from total benefits, taking into consideration the administrative aspect and the appropriate discount rate which has been decided (15 percent). One important issue will become evident here as the analysis continues and that will be the distinction between "with" and "without" project costs and benefits. A careful observation of the data presented under farm models will show that the traditional models are actually the "without" project effects while the other models represent the "with" project costs and benefits. At least this will be an aspect of the analysis which the

officials did not take into consideration and which I have contributed.

Table 5.1 is the farm budget for the traditional method of rice cultivation. The total revenue is seven hundred and three cedis and thirty-three pesewas (c703.33) per hectare per year. This was derived from two sources; the revenue from sale of the output which accounted for four hundred and sixty cedis (c460) and the net return to family labor which accounted for two hundred and forty three cedis and thirty-three pesewas (c243.33). The net return to family labor is the same for all the enterprises since it was stated earlier that family labor works the same number of hours irrespective of the enterprise. Also the return from output sales remains constant over the years based on the assumption of constancy of prices for inputs and output. On the outlay side for this enterprise total labor costs amounted to six hundred and twenty six cedis and eighty pesewas (c626.80) for the first year. Out of this amount one hundred cedis (c100.00) was spent on landclearing while ten cedis was spent on seed broadcasting. Two hundred cedis was spent on weeding and another two hundred and thirty six cedis and eighty pesewas was spent on child labor for the scaring away of birds that would otherwise destroy the crop. Eighty cedis was spent on harvesting. Seed costs amounted to thirty-two cedis and twenty pesewas (c32.20) while costs for a hoe, a sickle and sacks totalled forty-five cedis and fifty pesewas. Total outlays for the first year thus

Table 5.1:   Farm Budget for Traditional Method of Rice Cultivation
(1.0 hectare)

| | Unit | Project Year | | | |
		1	2	3	4-20
Total Revenues	cedis	703.33	703.33	703.33	11956.61
Crop		460	460	460	7820.00
Net return to family labor		243.33	243.33	243.33	4136.61
Outlays					
Labor:		626.8	526.8	526.8	8955.60
Landclearing		100.00	–	–	–
Seedbroadcasting		10.00	10	10	170.0
Fertilizer application		–	–	–	–
Weeding		200.0	200.0	200.0	3400.0
Birdscaring		236.80	236.8	236.8	4025.6
Harvesting		80.00	80.00	80.00	1360.0
Seed		32.20	32.20	32.20	547.4
Fertilizer 15:15:15		–	–	–	
Sulphate of ammonia		–	–	–	
Seed dressing		–	–	–	
Storage chemical		–	–	–	
Tools and others		45.50	–	45.50	364.0
Hoe		8.00	–	8.00	
Sickle		5.00	–	5.00	
Sack		32.50	–	32.50	
Total Outlays		704.5	559.0	604.5	9867.0
Net Revenues		(1.17)	144.33	98.83	2089.61

amounted to seven hundred and four cedis and fifty pesewas (c704.50). Based on total revenues and total costs the net undiscounted benefit in the first year was a loss of one cedi and seventeen pesewas. All negative figures in the tables are in parenthesis. There was a net loss only in the first year for this enterprise. In the second year no expenditures were incurred for landclearing, an activity that was undertaken only in the first year of the project. Also because of the assumption that hoes, sickles and sacks had a lifespan of two years each, no expenditures were incurred for these items in the second year and every other year. Total costs in the second year thus reduced to five hundred and fifty nine cedis thus resulting in a positive net undiscounted benefit of one hundred and forty four cedis and thirty-three pesewas. Because of the expenditures on hoes, sickles and sacks in alternate years the total outlays in the third year increased to six hundred and four cedis and fifty pesewas thus reducing the positive undiscounted net benefit to ninety-eight cedis and eighty-three pesewas. The years four to twenty all show positive undiscounted net benefits but the size of the benefit decreases or increases according as the year in question does not require or does require expenditures on hoes, sickles and sacks. The years four to twenty have been aggregated for space considerations and this practice will be extended to all the other enterprises.

Table 5.2 is the enterprise budget for the improved method of rice cultivation. The total revenue is eight hundred and eighty seven cedis and thirty-three pesewas. When we account for the amount for net return to family labor, the revenue attributable to output becomes six hundred and forty- four cedis. On the outlay side, total labor costs amounted to six hundred and forty cedis and eighty pesewas. Just as was the case for the traditional method this enterprise spent one hundred cedis for land clearing and ten cedis for seed broadcasting per hectare in the first year. It costs four cedis to apply fertilizer and two hundred cedis was spent for weeding. Two hundred and thirty six cedis and eighty pesewas was spent on child labor for scaring birds away from the crop. Since more mandays of labor was required for harvesting the expenditure also increased from eighty cedis to ninety cedis per hectare per year. Expenditure on seed was thirty two cedis and twenty pesewas per hectare per year. Total costs for the two kinds of fertilizer used were one hundred and thirty one cedis and twenty-five pesewas. Seed dressing that was used to treat the seeds before planting cost thirty-three cedis and sixty pesewas. The costs incurred for hoes, sickles and sacks amounted to fifty-eight cedis and fifty pesewas. Total costs for the enterprise for the first year amounted to eight hundred and ninety-six cedis and thirty-five pesewas leading to negative net undiscounted benefits of nine cedis and two pesewas. In the second year no expenditure was

Table 5.2: Farm Budget for Improved Method of Rice Cultivation
(1.0 hectare)

		Project Year			
	Unit	1	2	3	4-20
Total Revenues	cedis	887.33	887.33	887.33	15084.61
Crop		644	644	644	10948.00
Net return to family labor		243.33	243.33	243.33	4136.61
Outlays					
Labor:	cedis	640.8	540.8	540.8	9193.6
Landclearing		100.0	-	-	-
Seedbroadcasting		10.00	10	10	170
Fertilizer application		4.00	4.0	4.0	68
Weeding		200.0	200	200	3400
Birdscaring		236.8	236.8	236.8	4025.6
Harvesting		90.00	90.0	90.0	1530.0
Seed		32.20	32.20	32.20	547.4
Fertilizer		131.25	131.25	131.25	2231.25
15:15:15		73.75	73.75	73.75	1253.75
Sulphate of ammonia		57.50	57.50	57.50	977.50
Seed dressing		33.60	33.60	33.60	571.2
Storage chemical		-	-	-	-
Tools and others		58.50	-	58.50	468.0
Hoe		8.00	-	8.00	64
Sickle		5.00	-	5.00	40
Sack		45.50	-	45.50	364
Total Outlays		896.35	737.85	796.35	13011.45
Net Revenues		(9.02)	149.48	90.98	2073.16

incurred for either land clearing or hoes, sickles and sacks. Total costs thus decreased to seven hundred and thirty-seven cedis and eighty five cents resulting in positive net undiscounted benefits of one hundred and forty-nine cedis and forty-eight pesewas. In the third year there was no expenditure for landclearing but costs were incurred for the purchasing of hoes, sickles and sacks. Costs thus increased slightly over those for the second year. Net undiscounted benefits were positive but lower than those for the second year at ninety cedis and ninety-eight pesewas. Net benefits were positive for the years four to twenty but were higher or lower depending on whether or not expenses were incurred on hoes, sickles and sacks.

Table 5.3 is the farm budget for the advanced method of rice cultivation. The total revenue stood at one thousand one hundred and sixty-three cedis and thirty-three pesewas with nine hundred and twenty cedis being revenues from sale or output and the rest attributed to net return to family labor. On the cost side labor expenditures decreased to five hundred cedis and eighty pesewas largely because expenditures on land clearing were separated as a lump sum fee paid to government provided mechanization services which costs two hundred and sixty-five cedis per hectare in the first year. Ten cedis was spent on seed broadcasting while fertilizer application cost four cedis. Weeding costs one hundred and fifty cedis while expenditure on child labor for scaring birds away amounted to two hundred and thirty-six

Table 5.3: Farm Budget for Advanced Method of Rice Cultivation
(1.0 hectare)

	Unit	Project Year 1	2	3	4-20
Total Revenues	cedis	1163.33	1163.33	1163.33	19776.61
Crop		920	920	920	15640.0
Net return to family labor		243.33	243.33	243.33	4136.61
Outlays	cedis				
Labor:		500.8	500.8	500.8	8513.6
Landclearing		-	-	-	-
Seedbroadcasting		10.00	10	10	170
Fertilizer application		4.00	4.0	4.0	68
Weeding		150.0	150	150	2550.0
Birdscaring		236.8	236.8	236.8	4025.6
Harvesting		100.0	100	100	1700.0
Seed		36.8	36.8	36.8	625.6
Fertilizer		188.75	188.75	188.75	3208.75
15:15:15		73.75	73.75	73.75	1253.75
Sulphate of ammonia		115.00	115	115	1955.00
Seed dressing		38.4	38.4	38.4	652.8
Storage chemical		192.0	192.0	192.0	3264.0
Tools and others		78	-	78	624
Hoe		8.00	-	8.00	64
Sickle		5.00	-	5.00	40
Sack		65.00	-	65.00	520
Landclearing (mechanization)		265.00	-	-	-
Total Outlays		1299.75	956.75	1034.75	16888.75
Net Revenues		(136.42)	206.58	128.58	2887.86

cedis and eighty pesewas. The increase in output led to an increase in harvesting costs from ninety (for improved method) to one hundred cedis. Seed and fertilizer expenditures were thirty six cedis and eighty pesewas and one hundred and eighty-eight cedis and seventy-five pesewas respectively. Seed dressing cost thirty-eight cedis and forty pesewas while storage chemicals cost one hundred and ninety two cedis per hectare per year. Hoes, sickles and sacks costs seventy-eight cedis in the first year and every other year. Total costs in the first year were one thousand two hundred and ninety-nine cedis and seventy-five pesewas resulting in negative undiscounted net benefits of one hundred and thirty-six cedis and forty-two pesewas. In the second year no expenses were incurred for land clearing, hoes, sickles and sacks resulting in decreased total costs to nine hundred and fifty-six cedis and seventy-five pesewas. Net undiscounted benefits were positive at two hundred and six cedis and fifty-eight pesewas. In the third year costs were incurred for hoes, sickles and sacks. Total costs increased to one thousand and thirty-four cedis and seventy five pesewas. Net undiscounted benefits were still positive but lower than what was attainable in the second year. Net benefits for the years four through twenty were positive but higher or lower depending on whether or not expenses were incurred for hoes, sickles and sacks.

Table 5.4 is the farm budget for the irrigated method of rice cultivation. Total revenues for this enterprise

were one thousand eight hundred and fifty-three cedis and thirty-three pesewas out of which one thousand six hundred and ten cedis were sales of output and the rest was net return to family labor. Total labor costs are eight hundred and ninety-five cedis. This could have been higher except that costs for fertilizer application and sowing have been lumped together, as a service charge for government provided services, with the cost for fertilizer which amounted to five hundred and twenty-seven cedis and fifty pesewas. Land clearing cost two hundred and sixty five cedis, so did irrigation, and harvesting all of which were government provided services that attracted a lump sum service charge of two hundred and sixty-five cedis for each activity. Weeding cost ninety cedis per hectare per year, while seeds cost forty-one cedis and forty pesewas. Seed dressing cost forty-three cedis and twenty pesewas while storage chemical cost three hundred and thirty-six cedis per hectare per year. Hoes, sickles and sacks cost one hundred and thirty cedis per hectare per year. Total costs in the first year were one thousand nine hundred and seventy-three cedis and ten pesewas. This was higher than total revenue thus resulting in negative net undiscounted benefits of one hundred and nineteen cedis and seventy-seven pesewas in the first year. Second year total costs were lower because of the absence of costs for landclearing, irrigation, hoes,

Table 5.4: Farm Budget for Irrigated Method of Rice Cultivation
(1.0 hectare)

	Unit	Project Year 1	2	3	4-20
Total Revenues	cedis	1853.33	1853.33	1853.33	31506.61
Crop		1610	1610	1610	27370.00
Net return to family labor		243.33	243.33	243.33	4136.61
Outlays	cedis				
Labor:		895	630	630	10710.0
Landclearing		265	-	-	-
Seedbroadcasting		10	10	10	170
Irrigation (lump sum charge)		265	265	265	4505.0
Weeding		90	90	90	1530.0
Harvesting (lump sum charge)		265	265	265	4505.0
Seed		41.4	41.4	41.4	703.8
Fertilizer (includes (lump sum charge for application)		527.5	527.5	527.5	8967.5
15:15:15		147.5	147.5	147.5	2507.5
Sulphate of ammonia		115.0	115.0	115.0	1955.0
Seed dressing		43.2	43.2	43.2	734.4
Storage chemical		336.0	336.0	336.0	5712.0
Tools and others		130	-	130	1040.0
Hoe		8.00	-	8.00	64
Sickle		5.00	-	5.00	40
Sack		117.0	-	117.0	936
Total Outlays		1973.1	1536.7	1666.7	27163.9
Net Revenues		(119.77)	316.63	186.63	4342.71

sickles and sacks. This resulted in positive net undiscounted benefits of three hundred and sixteen cedis and sixty-three pesewas. Third year costs were slightly higher because of alternate year expenses incurred for hoes, sickles and cutlasses. Net undiscounted benefits were positive but lower than those for the second year at an amount of one hundred and eighty-six cedis and sixty-three pesewas. Net benefits for the next seventeen years were positive but the amount was higher or lower according as expenses were or were not incurred for hoes, sickles and sacks.

Table 5.5 is the farm budget for the mechanized method of rice cultivation. Total revenues are lower at seven hundred and three cedis and thirty-three pesewas. Only four hundred and sixty cedis were realized from output sales while the rest was attributable to net return to family labor. Lump sum fees of two hundred and sixty five cedis was charged per each of the following services performed by the government operated machinery; land clearing, seed broadcasting, fertilizer application, and harvesting. Someone in the ministry should have known that this enterprise was definitely unprofitable but as will be explained later on in Chapter six it was easy to include this enterprise in the project design. Thirty-two cedis and twenty pesewas was spent on seeds while fertilizer cost two hundred and five cedis. Seed dressing cost thirty-three cedis and sixty pesewas per hectare per year. Storage

Table 5.5:   Farm Budget for Mechanized Method of Rice Cultivation
(1.0 hectare)

	Unit	Project Year 1	2	3	4-20
Total Revenues	cedis	703.33	703.33	703.33	11956.61
Crop		460	460	460	7820.0
Net return to family labor		243.33	243.33	243.33	4136.61
Outlays	cedis				
Labor:		1120	855	855	14535
Landclearing (lump sum)		265	-	-	-
Seedbroadcasting		265	265	265	4505
Fertilizer application		265	265	265	4505
Weeding		60	60	60	1020
Harvesting (lump sum)		265	265	265	4505
Seed		32.20	32.20	32.20	547.4
Fertilizer		205.0	205	205	3485.0
15:15:15		147.5	147.5	147.5	2507.5
Sulphate of ammonia		57.50	57.50	57.50	977.50
Seed dressing		33.60	33.60	33.60	571.2
Storage chemical		96.0	96	96	1632.0
Tools and others		45.5	-	45.5	364.0
Hoe		8.00	-	8.00	64
Sickle		5.00	-	5.00	40
Sack		32.5	-	32.5	260
Total Outlays		1532.3	1221.8	1267.3	21134.6
Net Revenues		(828.97)	(518.47)	(563.97)	(9177.99)

chemical cost ninety-six cedis, while hoes, sickles and sacks cost forty-five cedis and fifty pesewas in the first year and every other year. Total costs were one thousand five hundred and thirty-two cedis and thirty pesewas. Costs were more than twice the revenue for the first year. Negative net undiscounted benefits were eight hundred and twenty-eight cedis and ninety-seven pesewas in the first year. Second year total costs also exceeded total revenues but not by as much as in the first year. No expenses were incurred for landclearing, neither were there any expenses for hoes, sickles and sacks. There were negative net undiscounted benefits of five hundred and eighteen cedis and forty-seven pesewas. In the third year costs were incurred for hoes, sickles and sacks thus the negative net undiscounted benefits increased to five hundred and sixty-three cedis and ninety-seven pesewas. Benefits for the years four through twenty were all negative but the absolute amount was lower or higher depending on whether or not there was expenditure on hoes, sickles and sacks.

Table 5.6 is the farm budget for the traditional method of millet cultivation. Total revenues were three hundred and forty-seven cedis and thirty-three pesewas out of which only one hundred and four cedis was revenue from sale of output with the rest being the net return to family labor. On the cost side expenditure on labor alone was seven hundred and seventy cedis in the first year, far in excess

Table 5.6: Farm Budget for Traditional Method of Millet Cultivation
(1.0 hectare)

	Unit	Project Year 1	2	3	4-20
Total Revenues	cedis	347.33	347.33	347.33	5904.61
Crop		104	104	104	1768.00
Net return to family labor		243.33	243.33	243.33	4136.61
Outlays	cedis				
Labor:		770	180	290	3940
Clearing		480	–	–	–
Land preparation		80	–	80	640
Planting		30	–	30	240
Weeding		80.0	80	80	1360
Harvesting		60	60	60	1020
Dehusking & shelling		40	40	40	680
Fertilizer application		–	–	–	–
Seed		3.64	–	3.64	29.12
Seed dressing		–	–	–	
Storage chemical		–	–	–	
Fertilizer		–	–	–	
15:15:15		–	–	–	
Sulphate of ammonia		–	–	–	
Tools and others		26.00	–	26.00	208
Hoe		8.00	–	8.00	64
Sickle		5.00	–	5.00	40
Sack		13.00	–	13.00	104
Total Outlays		799.64	180	319.64	4177.12
Net Revenues		(452.31)	167.33	27.69	1727.49

of total revenue. Land clearing cost four hundred and eighty cedis, while land preparation and planting cost eighty cedis and thirty cedis respectively. Weeding cost eighty cedis per hectare in the first year and every year over the projects duration. Harvesting cost sixty cedis per hectare every year while dehusking and shelling cost forty cedis every year. Seeds cost just three cedis and sixty-four pesewas in the first year and every other year. Hoes, sickles and sacks cost twenty-six cedis in the first year and every other year. Total costs in the first year were seven hundred and ninety-nine cedis and sixty-four pesewas resulting in negative net undiscounted benefits of four hundred and fifty-two cedis and thirty-one pesewas. Second year costs were far lower than those of the first year largely because there were no landclearing charges. In the second year and every other year there was no need for land preparation or planting because the yield from the crop in the second year was just as much as the yield in the first year, thus costs for those activities are avoided in alternate years. Weeding, harvesting, dehusking and shelling costs are, however, incurred every year. Just as was the case for the other enterprise, hoes, sickles and sacks each had a life span of two years so there were no associated expenditures in the second year and alternate years. Total costs in the second year were consequently low amounting to only one hundred and eighty cedis resulting in positive net undiscounted benefits of one hundred and sixty-

seven cedis and thirty-three pesewas. Total costs in the third year included expenditures on land preparation, planting, weeding, harvesting, dehusking and shelling. They also included expenditures on seeds, hoes, sickles and sacks. Third year costs amounted to three hundred and nineteen cedis and sixty-four pesewas resulting in positive net undiscounted benefits of twenty-seven cedis and sixty-nine pesewas. Net benefits for the remaining seventeen years were positive, but higher or lower depending on whether or not the year in question required expenditures on land preparation, planting, seeds and tools.

Table 5.7 is the farm budget for improved method of millet cultivation. Total revenues increased to four hundred and fifty-one cedis and thirty-three pesewas per hectare per year with two hundred and eight cedis attributed to output sales and the rest being net return to family labor. Labor costs amounted to eight hundred and thirty cedis in the first year. Four hundred and eighty cedis were attributed to land clearing while land preparation and planting cost eighty and thirty cedis respectively. Weeding costs amounted to eighty cedis while harvesting cost ninety cedis. Dehusking and shelling cost sixty cedis while fertilizer application cost ten cedis. Seed and seed dressing expenses were three cedis and sixty-four pesewas and six cedis and seventy two pesewas respectively. Fertilizer expenditures were one hundred and five cedis while tools and sacks cost thirty-nine cedis. Total costs

Table 5.7: Farm Budget for Improved Method of Millet Cultivation
(1.0 hectare)

		Project Year			
	Unit	1	2	3	4-20
Total Revenues	cedis	451.33	451.33	451.33	7672.61
Crop		208	208	208	3536.0
Net return to family labor		243.33	243.33	243.33	4136.61
Outlays	cedis				
Labor:		830	230	350	4870
Clearing		480	–	–	–
Land preparation		80	–	80	640
Planting		30	–	30	240
Weeding		80	80	80	1360
Harvesting		90	90	90	1530
Dehusking & shelling		60	60	60	1020
Fertilizer application		10	–	10	80
Seed		3.64	–	3.64	29.12
Seed dressing		6.72	–	6.72	53.76
Storage chemical		–	–	–	–
Fertilizer		105.00	–	105.00	840
15:15:15		59	–	59.00	472
Sulphate of ammonia		46.0	–	46.0	368
Tools and others		39.00	–	39.00	312
Hoe		8.00	–	8.00	64
Sickle		5.00	–	5.00	40
Sack		26.00	–	26.00	208
Total Outlays		984.36	230	504.36	6104.88
Net Revenues		(533.03)	221.33	(53.03)	1567.73

In the first year were nine hundred and eighty-four cedis and thirty-six pesewas resulting in negative net undiscounted benefits of five hundred and thirty-three cedis and three pesewas. Second year costs were lower because there were neither land clearing and land preparation nor planting and thus no charges. Expenses were incurred only for weeding, harvesting, dehusking and shelling. Second year costs were thus only two hundred and thirty cedis resulting in positive net undiscounted benefits of two hundred and twenty-one cedis and thirty-three pesewas. Third year costs included all itemized expenditure incurred in the first year except land clearing. Total third year costs were thus five hundred and four cedis and thirty-six pesewas resulting in expected negative net undiscounted benefits of fifty-three cedis and three pesewas. Net benefits for the years four through twenty were positive or negative depending on whether the year in question did not or did require expenses on items listed in the cost column for the first year with the exception of landclearing.

Table 5.8 is the farm budget for the traditional method of cotton cultivation. Total revenues per hectare per year are expected to be three hundred and seventy-three cedis and thirty-three pesewas out of which only one hundred and thirty cedis are revenues from output sales with the remaining amount being net return to family labor. Total labor costs in the first year were four hundred and eighty cedis out of which land clearing and land preparation each

Table 5.8: Farm Budget for Traditional Method of Cotton Cultivation
(1.0 hectare)

		Project Year			
	Unit	1	2	3	4-20
Total Revenues	cedis	373.33	373.33	373.33	6346.61
Crop		130.00	130.00	130.00	2210.0
Net return to family labor		243.33	243.33	243.33	4136.61
Outlays	cedis				
Labor:		480	380	380	6460
Clearing		100	-	-	-
Land preparation		100	100	100	1700
Fertilizer application		-	-	-	-
Planting		40	40	40	680
Weeding		80	80	80	1360
Harvesting		160	160	160	2720
Seed		18.2	18.2	18.2	309.4
Seed dressing		-	-	-	
Fertilizer		-	-	-	
15:15:15		-	-	-	
Sulphate of ammonia		-	-	-	
Tools and others		32.5	-	32.5	260
Hoe		8.00	-	8.00	64
Sickle		5.00	-	5.00	40
Sack		19.50	-	19.50	156
Total Outlays		530.7	398.2	430.7	7029.4
Net Revenues		(157.37)	(24.87)	(57.37)	(682.79)

incurred costs of one hundred cedis. Planting and weeding cost forty and eighty cedis respectively. Harvesting of cotton which was described to be a tedious process cost one hundred and sixty cedis per hectare per year. Seed cost eighteen cedis and twenty pesewas per hectare per year while tools and sacks cost thirty-two cedis and fifty pesewas in the first year and in alternate years. Total costs in the first year were five hundred and thirty cedis and seventy pesewas resulting in negative net undiscounted benefits of one hundred and fifty-seven cedis and thirty-seven pesewas. Second year labor costs were less than first year labor costs because no expenses were incurred for land clearing. There were also no expenses for tools and sacks, thus total costs were only three hundred and ninety-eight cedis and twenty pesewas but these still exceeded total revenues, thus resulting in negative net undiscounted benefits of twenty-four cedis and eighty-seven pesewas. Total costs were slightly higher in the third year than they were in the second year because of alternate year's expenditures on tools and sacks. Total costs were four hundred and thirty cedis and seventy pesewas resulting in negative net undiscounted benefits of fifty-seven cedis, and thirty-seven pesewas per hectare. Net benefits for each of the remaining seventeen years were negative but the absolute figure was low or high based on whether or not there were costs incurred for tools and sacks.

Table 5.9 is the farm budget for the improved method of cotton cultivation. Total revenues per hectare per year were estimated to be five hundred and three cedis and thirty-three pesewas out of which two hundred and sixty cedis were revenues from sale of output with the remaining amount being net return to family labor. Labor costs were five hundred and twenty-four cedis in the first year out of which one hundred cedis was spent for each of landclearing and land preparation. Four cedis was spent for fertilizer application, forty cedis for planting, eighty cedis for weeding and two hundred cedis for harvesting. Eighteen cedis and twenty pesewas was spent for seeds while seed dressing cost thirty-three cedis and sixty pesewas. Fertilizer cost one hundred and thirty one cedis and twenty-five pesewas. Forty-five cedis and fifty pesewas was spent for tools and sacks per hectare in the first year and in alternate years. Total costs in the first year amounted to seven hundred and fifty-two cedis and fifty-five pesewas resulting in negative net undiscounted benefits of two hundred and forty-nine cedis and twenty-two pesewas. Labor costs were lower in the second year because there was no expenditure on landclearing. Total cost was also lower in the second year because there was no expenses for hoes, sickles and sacks. On the whole net benefits were negative but the absolute amount was lower than it was in the first year. Third year total cost was slightly higher than that of the second year because of the cost incurred for tools

Table 5.9: Farm Budget for Improved Method of Cotton Cultivation
(1.0 hectare)

		Project Year			
	Unit	1	2	3	4-20
Total Revenues	cedis	503.33	503.33	503.33	8556.61
Crop		260	260	260	4420.0
Net return to family labor		243.33	243.33	243.33	4136.61
Outlays	cedis				
Labor:		524.00	424.00	424.00	7208.0
Landclearing		100	-	-	-
Land preparation		100	100	100	1700.0
Fertilizer application		4	4	4	68.0
Planting		40	40	40	680.0
Weeding		80.0	80	80	1360
Harvesting		200	200	200	3400.0
Seed		18.2	18.2	18.2	309.4
Seed dressing		33.6	33.6	33.6	571.2
Fertilizer		131.25	131.25	131.25	2231.25
15:15:15		73.75	73.75	73.75	1253.75
Sulphate of ammonia		57.5	57.5	57.5	977.50
Tools and others		45.50	-	45.50	364.0
Hoe		8.00	-	8.00	64
Sickle		5.00	-	5.00	40
Sack		32.5	-	32.5	260
Total Outlays		752.55	607.05	652.55	10683.85
Net Revenues		(249.22)	(103.72)	(149.22)	(2127.24)

and sacks. Net undiscounted benefits were negative but the absolute amount was higher than that for the second year. In the years four through twenty net undiscounted benefits were expected to be negative, but the loss was higher or smaller depending on whether or not there were expenses for tools and sacks.

Table 5.10 refers to the farm budget for the irrigated method of cotton cultivation. This is the most unprofitable of all the enterprises. Total revenue was estimated at six hundred and thirty-three cedis and thirty-three pesewas per hectare per year with three hundred and ninety cedis coming from crop sales and the rest being net return to family labor. Costs in the first year alone included one thousand three hundred and eighty-five cedis with lump sum fees of two hundred and sixty-five cedis being charged for each of the following government operated activities; landclearing, land preparation, fertilizer application, irrigation and harvesting. All these activities had labor costs under contract with the government. The other direct labor cost amounted to sixty cedis per hectare per year for weeding. Twenty-three cedis and forty pesewas was spent on seeds while seed dressing cost forty-three cedis and twenty pesewas. Fertilizer cost two hundred and sixty-two cedis and fifty pesewas, while tools and sacks cost sixty-five cedis in the first year and in alternate years. Total cost per hectare in the first year was one thousand seven hundred

Table 5.10: Farm Budget for Irrigated Method of Cotton Cultivation
(1.0 hectare)

| | Unit | Project Year | | | |
		1	2	3	4-20
Total Revenues	cedis	633.33	633.33	633.33	10766.61
Crop		390.0	390.0	390.0	6630.0
Net return to family labor		243.33	243.33	243.33	4136.61
Outlays	cedis				
Labor:		1385	1120	1120	19040
Landclearing		265	-	-	-
Land preparation		265	265	265	4505
Fertilizer application		265	265	265	4505
Irrigation		265	265	265	4505
Weeding		60	60	60	1020
Harvesting		265	265	265	4505
Seed		23.4	23.4	23.4	397.8
Seed dressing		43.2	43.2	43.2	734.4
Fertilizer		262.5	262.5	262.5	4462.5
15:15:15		147.5	147.5	147.5	2507.5
Sulphate of ammonia		115.0	115.0	115.0	1955.0
Tools and others		65	-	65	520
Hoe		8.00	-	8.00	64
Sickle		5.00	-	5.00	40
Sack		52.00	-	52.00	416
Total Outlays		1779.1	1449.1	1514.1	25154.7
Net Revenues		(1145.77)	(815.77)	(880.77)	(14388.09)

and seventy-nine cedis and ten pesewas, which was more than double the total revenue resulting in negative net undiscounted benefits of one thousand one hundred and forty-five cedis and seventy-seven pesewas. Second year total cost was also higher than total revenue. Total cost was, however, lower than that of the first year because no expenses were incurred for landclearing and tools and sacks. Net undiscounted benefits were negative amounting to eight hundred and fifteen cedis and seventy-seven pesewas. In the third year net undiscounted benefits were also expected to be negative at eight hundred and eighty cedis and seventy-seven pesewas because of the expense incurred for tools and sacks. The years four through twenty were also expected to have negative net benefits with the absolute figure being dependent on whether or not the year in question involved expenses for tools and others.

Table 5.11 is the farm budget for the traditional method of groundnut cultivation. Total revenue per hectare per year was expected to be five hundred and seventy-one cedis and thirty-three pesewas. Labor costs were low amounting to three hundred and twenty cedis in the first year with one hundred cedis being spent on landclearing while planting cost forty cedis. Weeding and harvesting cost eighty and fifty cedis respectively, while dehusking and shelling cost fifty cedis per hectare per year. Thirty-two cedis and eighty pesewas was spent on seeds, while tools

Table 5.11: Farm Budget for Traditional Method of Groundnut Cultivation
(1.0 hectare)

| | Unit | Project Year | | | |
		1	2	3	4-20
Total Revenues	cedis	571.33	571.33	571.33	9712.61
Crop		328.00	328.00	328.00	5576.0
Net return to family labor		243.33	243.33	243.33	4136.61
Outlays	cedis				
Labor:		320.00	220	220	3740
Landclearing		100	-	-	-
Planting		40	40	40	680
Fertilizer application		-	-	-	-
Weeding		80.0	80	80	1360
Harvesting		50	50	50	850
Dehusking and shelling		50	50	50	850
Seed		32.8	32.8	32.8	557.6
Seed dressing		-	-	-	-
Fertilizer 15:15:15		-	-	-	-
Sulphate of ammonia		-	-	-	-
Tools and others		39.00	-	39.00	312.0
Hoe		8.00	-	8.00	64
Sickle		5.00	-	5.00	40
Sack		26.00	-	26.00	208
Total Outlays		391.8	252.8	291.8	4609.6
Net Revenues		179.53	318.53	279.53	5103.01

and sacks cost thirty-nine cedis in the first year and in alternate years. Total costs were three hundred and ninety-one dollars and eighty pesewas resulting in expected positive net undiscounted benefits of one hundred and seventy-nine cedis and fifty-three pesewas. Total costs in the second year were lower because there was no expenditures for landclearing, tools and sacks, amounting to only two hundred and fifty-two cedis and eighty pesewas. There were positive net undiscounted benefits of three hundred and eighteen cedis and fifty-three pesewas in the second year. Net undiscounted benefits in the third year were positive but lower than they were in the second year because of expenses incurred on tools and sacks. Net benefits for the remaining years were all positive but the amount per year varied depending on whether or not expenses were incurred for tools and sacks.

Table 5.12 refers to the farm budget for the improved method of groundnut cultivation. Total revenues were expected to be eight hundred and fifty-eight cedis and thirty-three pesewas per hectare per year. Six hundred and fifteen cedis out of these revenues were expected to come from crop sales with the rest being net return to family labor. Total cost was six hundred and eighty-nine cedis and ninety pesewas in the first year. Out of this cost four hundred and thirty cedis is attributed to labor activities. Seed and seed dressing cost thirty-six cedis and ninety

Table 5.12: Farm Budget for Improved Method of Groundnut Cultivation
(1.0 hectare)

		Project Year			
	Unit	1	2	3	4-20
Total Revenues	cedis	858.33	858.33	858.33	14591.61
Crop		615	615	615	10455.0
Net return to family labor		243.33	243.33	243.33	4136.61
Outlays	cedis				
Labor:		430	330	330	5610
Landclearing		100	–	–	–
Planting		40	40	40	680.0
Fertilizer application		30	30	30	510
Weeding		80.0	80	80	1360
Harvesting		90	90	90	1530
Dehusking and shelling		90	90	90	1530
Seed		36.9	36.9	36.9	627.3
Seed dressing		32.0	32.0	32.0	544
Fertilizer		126.0	126.0	126.0	2142
15:15:15		70.8	70.8	70.8	1203.6
Sulphate of ammonia		55.2	55.2	55.2	938.4
Tools and others		65.0	–	65.0	520
Hoe		8.00	–	8.00	64
Sickle		5.00	–	5.00	40
Sack		52.0	–	52.0	416
Total Outlays		689.9	524.9	589.9	9443.3
Net Revenues		168.43	333.43	268.43	5148.31

pesewas and thirty-two cedis respectively. Fertilizer cost one hundred and twenty-six cedis while tools and sacks cost sixty-five cedis in the first year and in every other year. Net undiscounted benefits were positive at one hundred and sixty-eight cedis and forty-three pesewas in the first year. Second year costs were lower because there were no expenditures for land clearing, tools and sacks. Net undiscounted benefits were thus expected to increase to three hundred and thirty-three cedis and forty-three pesewas. Third year net undiscounted benefits were also expected to be positive but by less than the amount needed to be expended on tools and sacks. The years four through twenty were also expected to have positive net benefits but the yearly amount was expected to vary according as expenses were or were not incurred on tools and sacks.

5.1.1 RESULTS

Table 5.13 is the discounted cash flow per hectare for all the enterprises over the project's duration.   On a yearly basis the first year of the project resulted in negative net discounted benefit, the second year's benefits were positive while the third year's benefits were negative. In short,   the benefits were negative or positive in alternate years.   The most important aspect of the table, however, is the total discounted cash flow per enterprise column.   At the end of the twenty years four out of the twelve enterprises would have been unprofitable, that is one-third of the enterprises.   What is even more important is the   fact that the combined losses of these four enterprises outweighed the positive benefits from the other eight enterprises resulting in negative net total discounted cash flow.   The unprofitable enterprises would be (i) the mechanized method of rice cultivation, (ii) the traditional method of cotton cultivation,   (iii) the improved method of cotton cultivation,   (iv) the irrigated method of cotton cultivation.

Table 5.13: Discounted Cash Flow (cedis): Enterprise Table
(1.0 hectare per crop)

	Project Year				
	1	2	3	4-20	Total
Rice (traditional method)	-1.02	109.11	65.03	490.82	663.94
Rice (improved method)	-7.84	113.01	59.86	487.80	652.83
Rice (advanced method)	-118.68	156.17	84.61	679.3	801.40
Rice (irrigated method)	-104.20	239.37	122.80	1022.16	1280.13
Rice (mechanized method)	-721.20	-391.96	-371.09	-2144.29	-3628.54
Millet (traditional method)	-393.51	126.50	18.22	411.01	162.22
Millet (improved method)	-463.74	167.32	-34.89	380.4	49.09
Cotton (traditional method)	-136.91	-18.80	-37.75	-158.06	-351.52
Cotton (improved method)	-216.82	-78.41	-98.19	-495.23	-888.65
Cotton (irrigated method)	-996.82	-616.72	-579.55	-3361.86	-5554.95
Groundnut (traditional)	156.19	240.81	183.93	1195.46	1776.39
Ground (improved)	146.53	252.07	176.63	1207.34	1782.57
Total Discount Cash Flow (yearly)	-2858.02	298.47	-410.39	-285.03	-3860.46

Table 5.14b represents the discounted cash flow per enterprise based on the estimated number of hectares per enterprise. It will be recalled that the officials at the Ministry had no practical idea about the phasing in of the acreage. They assumed therefore that such phasing in would directly correspond with the percentage of cost incurred in the particular year except for the years four through twenty during which costs per year were low. Based on that assumption it was estimated that twenty-five percent of the acreage will be brought under cultivation in the first year. For each of the second and third years twenty-two percent of the acreage will brought under cultivation. The remaining thirty-one percent of the land area will be brought under cultivation on an equal instalment basis per year over the next seventeen years.

Based on the above assumptions Table 5.14a is created. Four thousand eight hundred hectares would be brought under rice cultivation in the first year with each enterprise covering nine hundred and sixty hectares. In the second year four thousand two hundred and twenty-four hectares would be brought into cultivation with each of the rice enterprises having eight hundred and forty-four and eight-tenth hectares under its umbrella. The same number of hectares in the second year would also be cultivated in the third year per each rice enterprise. Over the remaining seventeen years seventy hectares per year would be brought

Table 5.14a: Estimated Number of Hectares per Enterprise/Year
(cumulative)

	Project Year			
	1	2	3	4-20
Rice (traditional method)	960	1804.8	2649.6	3839.6
Rice (improved method)	960	1804.8	2649.6	3839.6
Rice (advanced method)	960	1804.8	2649.6	3839.6
Rice (irrigated method)	960	1804.8	2649.6	3839.6
Rice (mechanized method)	960	1804.8	2649.6	3839.6
Millet (traditional method)	3250	6110	8970	13000.02
Millet (improved method)	3250	6110	8970	13000.02
Cotton (traditional method)	1667	3133.67	4600	6667
Cotton (improved method)	1667	3133.67	4600	6667
Cotton (irrigated method)	1667	3133.67	4600	6667
Groundnut (traditional)	3150	5922	8694	12600
Ground (improved)	3150	5922	8694	12600

under cultivation for each enterprise. As regards millet cultivation the first year of the project would see three thousand two hundred and fifty hectares being cultivated for each enterprise. In the second year two thousand eight hundred and sixty hectares would be cultivated for each millet enterprise. The third year would also see two thousand eight hundred and sixty hectares being cultivated for each enterprise. For the remaining seventeen years each millet enterprise would have an additional two hundred and thirty-seven (237.06) hectares brought under cultivation per year. Each of the three cotton enterprises would have approximately one thousand six hundred and sixty-seven hectares under cultivation in the first year. In the second and third years respectively each enterprise would have additional one thousand four hundred and sixty-seven (1466.67) hectares under cultivation. Over the remaining seventeen years each enterprise would have one hundred and twenty-one (121.57) hectares brought under cultivation each year. Each of the two groundnut enterprises would have three thousand one hundred and fifty (3150) hectares under cultivation in the first year. In the second and third years respectively additional two thousand and seven hundred and seventy-two (2772) hectares would be cultivated for each of the two enterprises. Each enterprise would then have an additional two hundred and twenty-nine (229.76) hectares brought under cultivation every year over the remaining seventeen years.

From these hectares cultivated the discounted cash flow per enterprise numbered Table 5.14b was derived. One can observe that four enterprises would be unprofitable even on a farm basis. These enterprises are mechanized method of rice cultivation, and all the three cotton enterprises. The most profitable enterprises are the traditional and improved method of groundnut cultivation, each netting over six million cedis after twenty years. The other six enterprises also would have positive benefits after twenty years.

Table 5.14b however, does not present the actual state of the enterprises because it is based only on the hectares cultivated in a particular year and does not consider the cultivated area in previous years which still remain under cultivation. The Cumulative Discounted Cash Flow table numbered table 5.15 is based on the total acreage under cultivation per enterprise per year (Table 5.14a) and is therefore more representative of the enterprises. Based on these cumulative totals we still find mechanized rice cultivation and the three cotton enterprises to be the unprofitable ones. The other eight enterprises would be profitable at the end of twenty years with the two groundnut enterprises being the most profitable. Table 5.16 and table 5.17 are the discounted costs for the foreign exchange and local component costs respectively. To arrive at the total project costs and benefits we sum up tables 5.15, 5.16 and 5.17 to get table 5.18. The reader should be reminded that

Table 5.14b: Discounted Cash Flow (cedis): Enterprise Table
(based on estimated number of hectares per enterprise/year)

	Project Year				
	1	2	3	4-20	Total
Rice (traditional method)	-979.2	92,176.13	54,937.34	584,272.13	730,406.4
Rice (improved method)	-7,526.4	95,470.85	50,569.73	580,677.12	719,191.3
Rice (advanced method)	-113,932.8	131,932.42	71,478.53	808,638.72	898,116.87
Rice (irrigated method)	-100,032.0	202,219.78	103,741.44	1,216,779.3	1,422,708.5
Rice (mechanized method)	-692,352.0	-331,127.81	-313,496.83	-2,552,562.8	-3,889,539.4
Millet (traditional method)	-1,278,907.5	361,790	52,109.2	1,656,370.3	791,362
Millet (improved method)	-1,507,155	478,535.2	-99,785.4	1,533,012.0	404,606.8
Cotton (traditional method)	-228,183.79	-27,573.4	-55,366.79	-326,657.86	-637,781.84
Cotton (improved method)	-361,367.39	-115,001.6	-144,012.33	-1,023,477	-1,643,858.3
Cotton (irrigated method)	-1,661,370.0	-904,524.72	-850,008.6	-6,947,855.2	-10,363,759
Groundnut (traditional)	491,998.5	667,525.32	509,853.96	4,669,466.8	6,338,844.6
Groundnut (improved)	461,569.5	698,738.04	489,618.36	4,715,870.0	6,365,795.9
Total Discount Cash Flow	-4,998,238.1	1,350,160.2	-130,361.39	4,914,533.5	1,136,094.2

Table 5.15: Cumulative Discounted Cash Flow (cedis):
(based on total acreage under cultivation)

	Project Year				
	1	2	3	4-20	Total
Rice (traditional method)	-979.2	196,921.73	172,303.49	1,502,071.2	1,870,317.2
Rice (improved method)	-7,526.4	203,960.45	158,605.06	1,492,155.7	1,847,194.8
Rice (advanced method)	-113,932.8	281,855.62	224,182.66	2,078,099.1	2,470,204.6
Rice (irrigated method)	-100,032.0	432,014.98	325,370.88	3,126,316.8	3,783,670.7
Rice (mechanized method)	-692,352.0	-707,409.41	-983,240.06	-6,573,266.8	-8,956,268.3
Millet (traditional method)	-1,278,907.5	772,915	163,433.4	4,242,241	3,899,681.9
Millet (improved method)	-1,507,155	1,022,325.2	-312,963.3	3,903,596.5	3,105,803.4
Cotton (traditional method)	-228,183.79	-58,906.79	-173,650.38	-843,442.23	-1,304,183.2
Cotton (improved method)	-361,367.39	-245,685.19	-451,674.98	-2,638,443.7	-3,697,171.3
Cotton (irrigated method)	-1,661,370.0	-1,932,393.4	-2,665,935.8	-17,891,479.0	-24,151,178
Groundnut (traditional)	491,998.5	1,426,076.8	1,599,087.4	12,014,913	15,532,076
Groundnut (improved)	461,569.5	1,492,758.5	1,535,621.2	12,130,428	15,620,377
Year Total	-4,998,238.1	2,884,433.5	-408,860.43	12,543,190	10,020,525

Table 5.16: Foreign Exchange Component: Discounted Costs (cedis)

(Discounted Values for Table 3.15)

| | Project Year | | | | |
	1	2	3	4-20	Total
Buildings	6,452,507.3	4,138,873.2	1,963,883.3	0	12,555,264
Plants, Vehicles Equipment	8,562,692.3	1,792,003.5	248,724	141,083.7	10,744,504
Plant and Vehicle Operations	611,131.5	1,493,137.8	1,383,527.3	356,208.6	3,844,005.2
Physical Contingencies	887,922.0	471,517.2	276,705.45	33,889.5	1,670,034.2
Total Discounted Foreign Exchange Costs	16,514,253.1	7,895,531.7	3,872,839.8	531,181.8	28,813,086

5.17: Local Currency Component Discounted Costs (cedis)

(Discounted Values for Table 3.16)

	Project Year				
	1	2	3	4-20	Total
Buildings	408,900	262,785.6	124,691	0	796,376.6
Plants, Vehicles Equipment	543,663	113,778	15,792	8,957.6	682,190.6
Salaries, Allowances	1,293,690	1,307,880	1,210,720	112,731.3	3,925,021.3
Plant and Vehicle Operations	38,802	94,802.4	87,843	22,616.2	244,063.6
General Administration	56,550	32,508	16,450	0	105,508
Physical Contingencies	56,376	29,937.6	17,568.6	2,151.8	106,034
Total Discounted Foreign Exchange Costs	2,397,981	1,841,691.6	1,473,064.6	146,456.9	5,859,194.1

5.18: Project Costs and Benefits

		Project Year			
	1	2	3	4-20	Total
Costs:					
Local Currency Component	2,397,981	1,841,691.6	1,473,064.6	146,456.9	5,859,194.1
Foreign Exchange Component	16,514,253.1	7,895,531.7	3,872,839.8	531,181.8	28,813,806
Total Costs	18,912,234	9,737,223.3	5,345,904.4	677,638.7	34,673,000
Benefits					
Crops	-4,998,238.1	2,884,433.5	-408,860.43	12,543,190	10,020,525
Net Benefits	-23,910,472	-6,852,789.8	-5,754,764.83	11,865,551	-24,652,475

tables 5.16 and 5.17 are the off-farm costs and that the on-farm costs have already been accounted for under crops benefits. From table 5.18 we observe that the first three years would register losses that are very substantial. Over the remaining seventeen years total net benefits would be positive but the amount would not be enough to offset the huge losses of the first three years thus resulting in negative total net benefits for the project at the end of the twenty years. Based on this outcome the project should not have been undertaken in the way it was originally designed.

5.2 ALTERNATIVE DESIGN

In the preceding section we observed and concluded that the project in its original design (tables 5.14a, b and table 5.15) should not have been undertaken. This is due to the fact that by the inclusion of the four enterprises the losses that were incurred were too much and thus outweighed the positive gains from the remaining eight enterprises. By alternative design I am suggesting that those four enterprises should have been deleted from the design. The mechanized method of rice cultivation should have been deleted and the land area divided among the four remaining rice enterprises. In the case of the three unprofitable cotton enterprises I am suggesting that they should have been deleted. I am not in a position to say whether or not the land area for these enterprises should then have been

alloted to any of the remaining enterprises because the agronomic conditions may or may not be compatible with the cultivation of the other crops. Leaving the land unutilized would not have subtracted from the project.

Based on the above suggestions an alternative design would have increased the first year acreage cultivated for each of the four remaining rice enterprises to twelve hundred hectares. In the second and third years each enterprise would have additional one thousand and fifty-six hectares brought under cultivation each year. Over the remaining seventeen years each enterprise would have approximately eighty-seven hectares brought under cultivation per year. The millet enterprises and the groundnut enterprises would not experience any changes from their original designs. The other major change would be the elimination of the three cotton enterprises and their associated losses. From the above changes table 5.19 representing the discounted Cash Flow would be derived. this table would show that at the end of the twenty years each enterprise would have positive benefits. It is only in the first year of the project that losses would occur. The alternative design would also result in table 5.20 which is the cumulative discounted cash flow. This table would also show that all eight enterprises would be profitable after twenty years and that it is only in the first year of the project that on-farm benefits would be negative. Table 5.21

Table 5.19: Discounted Cash Flow: (Based on Alternative Design)

		Project Year		
	1	2	3	4-20
Rice (traditional method)	-1,224	115,220.16	68,671.68	730,340.16
Rice (improved method)	-9,408	119,338.56	63,212.16	725,846.40
Rice (advanced method)	-142,416	164,915.52	89,348.16	1,010,798.40
Rice (irrigated method)	-125,040	252,774.72	129,676.8	1,520,974.10
Millet (traditional method)	-1,278,907.5	361,790	52,109.2	1,656,370.3
Millet (improved method)	-1,507,155	586,643.2	-99,785.4	1,967,284.8
Ground nut (traditional method)	491,998.5	667,525.32	509,853.96	4,669,466.8
Ground nut (improved method)	461,569.5	698,738.04	489,618.36	4,715,870.0
Total Discount Cash Flow	-2,110,582.5	2,966,945.5	1,302,704.9	16,996,951

Table 5.20: Cumulative Discounted Cash Flow (Alternative Design)

	Project Year				
	1	2	3	4-20	Total
Rice (traditional method)	-1,224	246,152.16	215,379.4	1,877,603.4	2,337,910.9
Rice (improved method)	-9,408	254,950.56	198,256.3	1,865,208.9	2,309,007.8
Rice (advanced method)	-142,416	352,319.52	280,228.3	2,597,643.6	3,087,775.4
Rice (irrigated method)	-125,040	540,018.72	406,713.6	3,908,013.5	4,729,705.8
Millet (traditional method)	-1,278,907.5	772,915	163,433.4	4,242,241	3,899,681.9
Millet (improved method)	-1,507,155	1,022,325.2	-312,963.3	3,903,596.5	3,105,803.4
Ground nut (traditional)	491,998.5	1,426,076.8	1,599,087.4	12,014,913	15,532,076
Ground nut (improved)	461,569.5	1,492,758.5	1,535,621.2	12,130,428	15,620,377
Total Discount Cash Flow	-2,110,582.5	6,107,516.5	4,085,756.3	42,539,648	50,622,339

Table 5.21: Alternative Design Project Costs & Benefits

	Project Year				
	1	2	3	4-20	Total
Costs:					
Local Currency Component	2,397,981	1,841,691.6	1,473,064.6	146,456.9	5,859,194.1
Foreign Exchange Component	16,514,253.1	7,895,531.7	3,872,839.8	531,181.8	28,813,806.0
Total Costs	18,912,234	9,737,223.3	5,345,904.4	677,638.7	34,673,000
Benefits:					
Crops	-2,110,582.5	6,107,516.5	4,085,756.3	42,539,648	50,622,339
Net Benefits	-21,022,816.5	-3,629,706.8	-1,260,148.1	41,862,009.3	15,949,339

is the alternative design project costs and benefits. The first three years of the project would result in losses even under this alternative design. The remaining seventeen years would, however, result in positive net benefits that exceed the losses for the first three years combined resulting in positive net benefits for the project at the end of twenty years. This alternative design therefore should have been considered.

5.3 "WITH" AND "WITHOUT" DISCUSSION

The costs and benefits that were identified and valued under this project analysis for the Upper Region Agricultural Development Project refer to those costs and benefits that arose with the project as compared to what would be the situation without the project. This is the reason why we refer to the changes in output as incremental net benefit. This "with" and "without" situation presumably accounts for changes in production that would occur without the project. Even though officials admitted to using the with and without situation I consider that to be redundant because the assumption of constancy in prices for outputs and inputs and even the assumption of constancy in output removes the effects of any changes that would have occurred in the project's absence. The constancy assumption eliminated a lot of variables that would have contributed to changes, such as improved seed varieties, improved

techniques of production and storage, and changes in tastes and preferences.

CHAPTER SIX

PERFORMANCE FACTORS

In chapter 2 section 2, I mentioned that the bureaucratic structure of the Ministry of Finance and Economic Planning does affect the performance of the budget. Under this structure I discussed that the organizational structure that relies on centralized planning (top-down) ignores some social and environmental factors and also makes the process of budget formulation less participatory. We also saw that the existence of four principal secretaries leads to power struggles because none of them is prepared to let his or her division play a subordinate role to the others in situations where the roles overlap. The structure of the ministry is, however, not the only factor that affects performance. Other factors like consistency of problems, resource scarcity, environmental, and power over efficiency do affect performance, as discussed below.

6.1. CONSISTENCY OF PROBLEMS

If any interested observer reads the budget statements released over the years she or he will find that some of the problems alluded to in earlier chapters are pervasive. It was recognized in 1977 that budget deficits persist and the

deficit would have to be financed by borrowing from the banking system, a method that everyone knew would worsen the inflationary situation in the country. In 1978 the same government recognized that problems do exist with the implementation of the budget and came out with a number of expenditure control measures. The first of these measures was the establishment of budget and planning units in all the key ministries, departments and agencies responsible for the preparation and implementation of government projects. Secondly, the ministry of finance was authorized not to release funds for projects which had not been approved and had therefore not been provided for in the annual estimates. Thirdly, the ministry of finance was directed to arrange periodic visits to project sites to ascertain progress of work. Fourthly, contractors undertaking government projects were advised to keep proper accounts on their operations with such accounts eligible for periodic inspection by the Auditor-General's department. Failure to comply would lead to ineligibility for further government contracts. Also, it was stated that contractor's bidding for government contracts must show evidence of the possession of appropriate machinery and equipment for the work and also indicate prior arrangement for the maintenance of the equipment. These measures did not seem to have had any effect because in 1979 the new government also decided to introduce firm measures aimed at reducing to a minimum much of the waste that exists in the expenditure pattern of

government agencies. They reaffirmed the policy of establishing budget and planning units in each ministry. It was also recognized that most of the capital projects had remained uncompleted in the budget over many years, thus locking up scarce financial resources while actual and effective utilization of encumbered funds remains unknown. To remedy this situation the monitoring unit was singled out for strengthening to provide more effective data collection system that will make it possible for the ministry to justify such proposals and stress their impact on the economic and social development of the country. The new government also reaffirmed the policy of eliminating the deviations from planned targets which results from extra-budgetary commitments authorized by functional ministries but more particularly by regional organizations. Similar measures were laid down in the budgets for subsequent years meaning that the previous measures described above were unsuccessful.

6.2. RESOURCE SCARCITY

In the introductory chapter I discussed the problem of low investment and its effect on the productive capacity of the economy. The low productive capacity affects the ability to import which also affects input availability. The low investment over the years has not been sufficient to maintain and rehabilitate existing productive capacity, nor to provide for new capacity. The low investment stems from

a decline in the supply of both domestic and foreign savings.

The above situation was reflected in the budget statement of 1980 by the government's determination to pursue realistic policies with respect to maintenance and development of the infrastructural base of the country. The statement also revealed the governments' intention to solicit world bank help to maintain deteriorating roads, and to provide water, energy, rail, aviation, housing and health facilities. Resource scarcity was not limited to infrastructural facilities alone. The Upper Region Agricultural Development suffered from limited availability of seeds that were required for various yearly targets to be met. In Table 6.1 data are provided on percentage requirement of seed needs that would be met. No account was given of how the remaining percentages were to be fulfilled. My guess is that these shortages would present problems for the operation of the project. For the years for which data were available (1976-1980) the table shows that not more than thirty-three percent of the seed requirements for rice would be met. In 1976 the percentage that would be met for millet seed requirement was not significant (NS) and this percentage would increase to only seven percent in 1980. Groundnut cultivation would also suffer from seed deficiency because according to the data only about one and one-third (1.3) percent of the total requirement would be met in 1976

Table 6.1: Seed Production Targets (1976-1980)
(Percentage of requirement that would be met)

	1976	1977	1978	1979	1980
Rice	33.8	33.3	33.3	33.3	33.3
Millet	-	2	5	7	7
Groundnut	1.3	3.7	5.7	8.1	10.1

Source: Ministry of Agriculture
Five Year Development Plan (1975/76 - 1979/80)
Part II.

with the percentage met rising to ten and one-tenth (10.1) in 1980. No data were available for cotton but there is no reason to expect a more favorable situation.

Part of the reason for resource scarcity may also be traced to the military regime which seized power in 1972. This regime paid less attention to matters of infrastructure and maintenance, let alone development. According to Naomi Chazan (1983) with the advent of this regime road servicing and highway repairs ceased and import restrictions limited the availability of critical spare parts for transportation and other facilities.

6.3. ENVIRONMENTAL FACTORS

Shortly after the Upper Region Agricultural Development was launched Ghana as did most of Sub-Sahara Africa experienced one of the worst famines in recent history. This was due to the lack of rainfall in the late 1970s and early 1980s. As a result of this drought, farms were destroyed or abandoned because crops that were planted did not grow and those farmers that experienced crop growth had the agony of seeing their farms destroyed by bush fires. Of course, experts suggest that rapid population growth, deforestation and lack of agricultural research all contributed to the drought and famine. One can be certain that this affected the project and it is no wonder that Ghana was listed as one of the countries that were to benefit from the USA for Africa project. World Bank reports

argue that drought is part of a deeper problem that has its roots in high and accelerating population growth and in low and declining efficiency in the use of resources.

Drought is no longer a problem in Ghana, but it is feared that if adequate provisions are not made for alternatives like irrigation and drought resistant crops, we may have to live with the consequences of drought in the future.

6.4. POWER vs. EFFICIENCY

In the analysis it was found that four enterprises would be unprofitable after twenty years and that an alternative design that deleted these four enterprises would increase the profitability of the project. However, these enterprises remained as part of the project simply because those farmers taking part in the project under these four enterprises were mostly absentee farmers working in the capital as senior civil servants or had connections with the policy makers. Most of them did not pay for those services which drew lump sum charges. Due to their connections or by virtue of their positions they used these services freely and thus did not account for them in their private accounting, but the analyst concerned with economic prices accounted for those charges. Thus, to the powerful farmer those enterprises were profitable, while to an analyst they were unprofitable. In terms of efficiency, therefore, those four enterprises should not have been included in the

project, or the farmers involved should have paid all costs

if they wished to proceed with these crops.

CHAPTER SEVEN

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

7.1 SUMMARY OF FINDINGS

The objective of the study was to examine projects included in the development budget and determine whether or not these projects contribute to development. To make this study manageable I focussed on the agricultural sector because of its importance to the economy and selected the Upper Region Agricultural Development Project. In order to determine the contribution of this project to development I analyzed the profitability or net worth and ended up with the following findings.

The study revealed that of the twelve models or enterprises only eight would be profitable after twenty years. The four unprofitable models would be:

(i)   mechanized method of rice cultivation

(ii)   traditional method of cotton cultivation

(iii)   improved method of cotton cultivation

(iv)   irrigated method of cotton cultivation

The combined losses from these four models would outweigh the benefits from the remaining eight models thus rendering the entire project unworthy. However, the four models were included in the project because most of the people involved

were powerful but absentee farmers who were either directly involved in policy making and/or had enormous influence on the policy makers.

What this situation amounted to was the subsidization of a few participants by the rest and with public funds. Thus, the subsidy led to only a few farmers benefitting from inputs like fertilizer and government provided and operated machinery. We know that such subsidization imposed huge financial burdens on the government and generated allocative inefficiencies in a poor country like Ghana (Stiglitz, 1987). Such input subsidy not only distorted input choice, but also may have required higher taxes elsewhere in the economy to generate those funds used for the subsidy. The subsidy for the use of government provided and operated machinery and perhaps fertilizer could also have skewed farm income distribution, since it reduced agricultural employment and concentrated farm income in the hands of the rich (Gilbert Brown, 1983). Observation of the other models showed that those farmers not relying on mechanization and other related activities did use more mandays of labor per hectare and may have contributed more toward a fairer income distribution. If we consider the use of subsidies in the context of Ghana's inability to benefit from her investments then we realize how important it is for capital to be wisely accumulated and utilized (Anderson, 1987).

7.2 ALTERNATIVE DESIGN

For the purpose of comparison and as a suggestion for future consideration an alternative analysis of the project was proposed as presented below in a tabular form.

	Original Analysis	Alternative analysis
Factors		
Prices	administered prices	shadow prices (economic prices)
Discount rate	conventional rate (12 percent)	15 percent to highlight dearth of financial resources
Exchange rate	official rate ($1:¢1.15)	Shadow rate ($1:¢2.0125) (official rate plus a premium)
Enterprise	12	8 (excluding mechanized rice, and the three cotton enterprises)

Basically what I am suggesting is that shadow prices should be used to reflect scarcity of physical and financial resources.   Also the number of enterprises included in the project should be eight, not twelve.   The inclusion of eight enterprises and the usage of shadow prices would have eliminated the need for subsidization, which occurred under the original analysis.

7.3 LIMITATIONS OF THE STUDY

Usage of   cost-benefit analysis as a   method of evaluation of projects for their inclusion in the budget

presents problems connected with shadow prices - shadow exchange rates, shadow wage rates, and appropriate discount rates. The usage of a foreign exchange premium to approximate the shadow exchange rate does not in any way suggest that there is equilibrium in the supply of and demand for foreign exchange. In a similar vein the choice of a discount rate does not imply "the price of capital" because the flow of investment funds is variable. In a general sense shadow prices do correct only current problems as they relate to the analysis, but as the time horizon expands so do distortions increase thus rendering original shadow prices inappropriate. These shadow prices are also specific to particular projects because if we apply them to the economy in general, private enterprises that use such prices in their accounting will experience losses and thus increase the need for more subsidies.

Under data presentation and analysis I made references to farm models which in practice should have reflected what each group of farmers was likely to do, but these models actually reflected what the analyst wanted the farmers to do. Assumptions about the rates of phasing in of areas to be brought under cultivation and the projection of increases in productivity cannot be said to be realistic. The assumption that yields will remain constant is fallacious since it presumed that yields have already reached maximum levels and cannot be increased by introducing new technologies or other improvements (M. Brown, 1982). The

analysts assumed that conditions could not deteriorate in the absence of the project, thus underestimating the value of the project. They also assumed that conditions could not improve without the project, thus overestimating benefits of the project. Assumptions about constancy of the prices of inputs and output could also introduce problems. The nature of the project requires that some inputs be imported, thus such inputs' prices could be affected by imported as well as domestic inflation while output prices will be affected basically by domestic inflation.

The contribution of investment to growth can be better assessed by using the social efficiency of investment in the analysis and that is why the concept of shadow pricing was discussed in relative detail and the implications for the cost-benefit analysis enumerated. Of course, this kind of investment, that neglected the provision of infrastructure and other economic incentives for the private sector, could not be expected to have positive returns. Over the years the various governments in Ghana have exhibited consistent interest in public sector investments of which the Upper Region Agricultural Development Project was one, despite the generally accepted view that the majority of such public sector enterprises often performed inefficiently. Such investments have become a drain on Ghana's meager resources in terms of foregone economic development (Marsden and Belot).

7.4 BUREAUCRATIC BOTTLENECKS

Coming back to the problem of inefficiencies, one must not lose account of the fact that all these governments contain alliances which reflect both broad political-economic forces and narrower internal bureaucratic interests, both of which cut across the formal differences between officials and politicians (Lamb, 1987). One cannot blame the analyst for whatever inefficiencies may arise in the derivation of public investment policy, since the impacts of those alliances are usually interventionist. These alliances also have political interests which can differ in important respects from their formal responsibilities for governance. Most bureaucrats do represent political forces made up of economic interests, regional and ethnic coalitions as well as unions or military factions. Some bureaucrats whose word often override those of the analyst also have political connections and bureaucratic interests to protect, especially the legitimate or often illicit rents flowing from the implementation of particular policies.

The administration of the budget is essentially a bureaucratically implemented development strategy. As a reminder, the Upper Region Agricultural Development Project was one of a number of projects intended for each of the nine regions of the country as part of the objective of balanced regional development. This objective was determined at the center and with it came the proliferation

of bureaucratic structures with high overhead costs of which
the project under discussion is a typical example. By
requiring relatively too much foreign exchange for the
infrastructure and machinery, the Upper Region Agricultural
Development Project and many like it have left the system to
pay for externalities, including balance of payment
problems, displacement of labor and skewed income
distribution. Since these bureaucratic units are linked
upwards and not downwards, they reduced accountability
within local communities, and neglected local knowledge and
expertise in favor of outside advice, and also encouraged
the peasant farmers to accept an increased dependency on
outside sources of inputs and expertise as necessary costs
of development. With the planners and most experts residing
in Accra, and ignorant of the rural sector in general and of
subsistence farming in particular, they failed to account
for realities at the local level. Why for instance was
millet included in the project and not maize. It is true
that millet is a staple for the people of the Upper region
but its cultivation is mostly for subsistence and does not
command a significant market. Maize, on the other hand, is
a local as well as national staple that has a wide market
nationally and across the borders. Inclusion of maize would
have contributed to an increase in the participants' incomes
and enabled them to take advantage of the services provided
by the project to improve the well-being of their families.
Most governments in Ghana since independence shunned

governmental reinforcement of local self-reliance efforts and have made little attempt to connect or utilize the structure of traditional society and life to promote economic development. References to villages are negative, often blaming rural exodus to urban areas as a hindrance to government objectives, instead of focussing on the causes of the exodus in order to devise fruitful policy measures.

Even if these analytical problems are overcome the analyst cannot be confident about the outcome of the job she or he has done because the overall budget, of which the project is but a small part, also has deficiencies in structure, content and implementation, which reduce its efficiency and slows down attainment of the development objectives. There are problems of dichotomization between recurrent and development budgets overseen by different divisions of the ministry which may or may not relate to each other. Problems do arise when recurrent budget estimates are made for projects that are deleted in the development budget and vice versa. There are also problems of duplication of functions and objectives that often lead to conflicts and power struggles, as well as problems relating to implementation and monitoring. There is also the top-down bureaucratic approach that relies extensively on processed data and the expertise of city-oriented analyst and planners who tend frequently to ignore rural knowledge.

7.5 RECOMMENDATIONS FOR FURTHER RESEARCH

In analyzing this project and many like it, one has to deal with data problems resulting from insufficient information and processed data. The assumption that yields will remain unchanged during the life of the project is fallacious. It presumes that either maximum attainable levels of production have been reached or that conditions that can cause yields to decline are unlikely. The drought of the early 1980s certainly is a reminder that the assumption of constancy in yields can be very wrong in reality. Data based on yields before the project are not reliable, and data based on experimental farms are misleading because such farms are operated under conditions that approximate the ideal and farmers rarely achieve the same results.

Agricultural projects, in particular, present problems because the farmers have no control over their environment. Uncertainty in production and prices affect the reliability of the data. Assumption of constancy in prices ignores real relative changes that could occur in the relationship between input and output prices. It is important to know the factors that can seriously affect the project and to test the effect of changes in the values of these factors on the original results (M. L. Brown, 1982, p. 131-132). Project costs and benefits can be adjusted to reflect what

would happen under a different set of circumstances and recalculate the net present worth under each alternative set of circumstances.

The technique for carrying out the above is called sensitivity analysis. It can be applied to the different factors one at a time or to a combination of changes in the value of several factors. Further research should introduce sensitivity analysis covering the discount rate and shadow price of foreign exchange. This should also be done to account for the unrealistic assumption of constancy in prices of inputs and outputs, and the assumption that yields will remain constant over the years. By undertaking such sensitivity analysis the researcher will be accounting for data unavailability and also be able to deal with expected changes in the future. This will introduce some semblance of reality aimed at eliminating problems connected with the unknown. This will of course, require a lot of financial and other resources.

7.6. CONCLUDING REMARKS

Having said all of the foregoing, it is important to note that hindsight is perfect vision. It is easier for me to criticize the efforts of the analysts, bureaucrats and politicians who in their diverse functions are all trying their best to help in Ghana's development struggle. Whatever criticisms and suggestions I have made were done in the context of an academic exercise and were not intended to

substitute for the efforts of the functionaries in the system.

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