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A CRITICAL APPRAISAL OF AN EVALUATION OF PEASANT COLONISATION
AND SETTLEMENT IN THE GAL OYA VALLEY OF CEYLON

Plan 'B' Research Paper Submitted To The
College of Agriculture,
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by

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ACKNOWLEDGEMENTS

Edward Hall sums up some of the feelings I have attempted to express in this paper, as follows -:

"Much of the worshipping at the shrine of scientific methodology in the social sciences these days smacks more of a formal system than a technical one. In these times it seems to be remarkably easy for scientists to turn into priests. Though unlike the ordained priest who knows he is a priest and receives the backing of a formal organization, the ritualistic scientist is engaged in a disconcerting masquerade." (The Silent Language ; pp 89-90).

To some, the use of the benefit-cost technique provides the best expression of objectivity in project evaluation. Perhaps, the desire may be to appear more 'scientific' than objective; in itself a value judgement which economists pretend to be free of. The danger is if, in the process, the 'means' are enthroned while the 'ends' just fade away.

This Plan B paper of mine for the completion of a Master's degree in Agricultural Economics began with a suggestion by Professor Rainer Schickele that I take a critical look at the GOPEC's report, a copy of which ^{he} had brought all the way to MSU from Ceylon, in view of my field experience in the Gal Oya Valley of Ceylon. If I am permitted to dedicate this paper to somebody, it would be to Rainer and his charming Lady Beth, whose experience and knowledge I had the opportunity of benefiting from.

Dr. Eicher was my thesis director. I thank him for his attention despite his heavy work and the frequent hops across the US and the Atlantic. To Dr. Manderscheid, my acting Major Professor, a very big 'thank you': A chat with him has always - I mean ALWAYS - paid dividends, or given a great deal of moral support and confidence. Can you believe that I shied away from him at the start of my career here in MSU !

May be because of his fame in quantitative techniques! or is it his name? I don't know. To Drs. Libby and Updegraff, my thanks for putting me on the right path in understanding the benefit-cost technique, though I wish they had been more demanding in AEC 811 (now that I have finished the course!). Dr. Updegraff as a member of my Thesis Committee was always ready to discuss and clarify a point that I wished to make; I am afraid I over-exploited this willingness on his part.

I am very grateful to Bob Ranger, a colleague of mine in this department, for teaching me how to use his computer program, for accompanying me to the punch machines and making me do all the punching & c, and for his patience in examining the several sets of results I obtained from the computer and for answering the many questions and complications that I confronted him with right through the entire set of sensitivity tests.

Finally, a word about my family: My wife Dharmaseeli and my two daughters Gothami and Visakha had quite a lot of fun while I was plugging away at my paper; this made my task lighter.

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Department of Agricultural Economics,
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Winter 1972.

A CRITICAL APPRAISAL OF AN EVALUATION OF PEASANT COLONISATION
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A CRITICAL APPRAISAL OF AN EVALUATION OF PEASANT COLONISATION
AND SETTLEMENT IN THE GAL OYA VALLEY OF CEYLON







I - INTRODUCTION

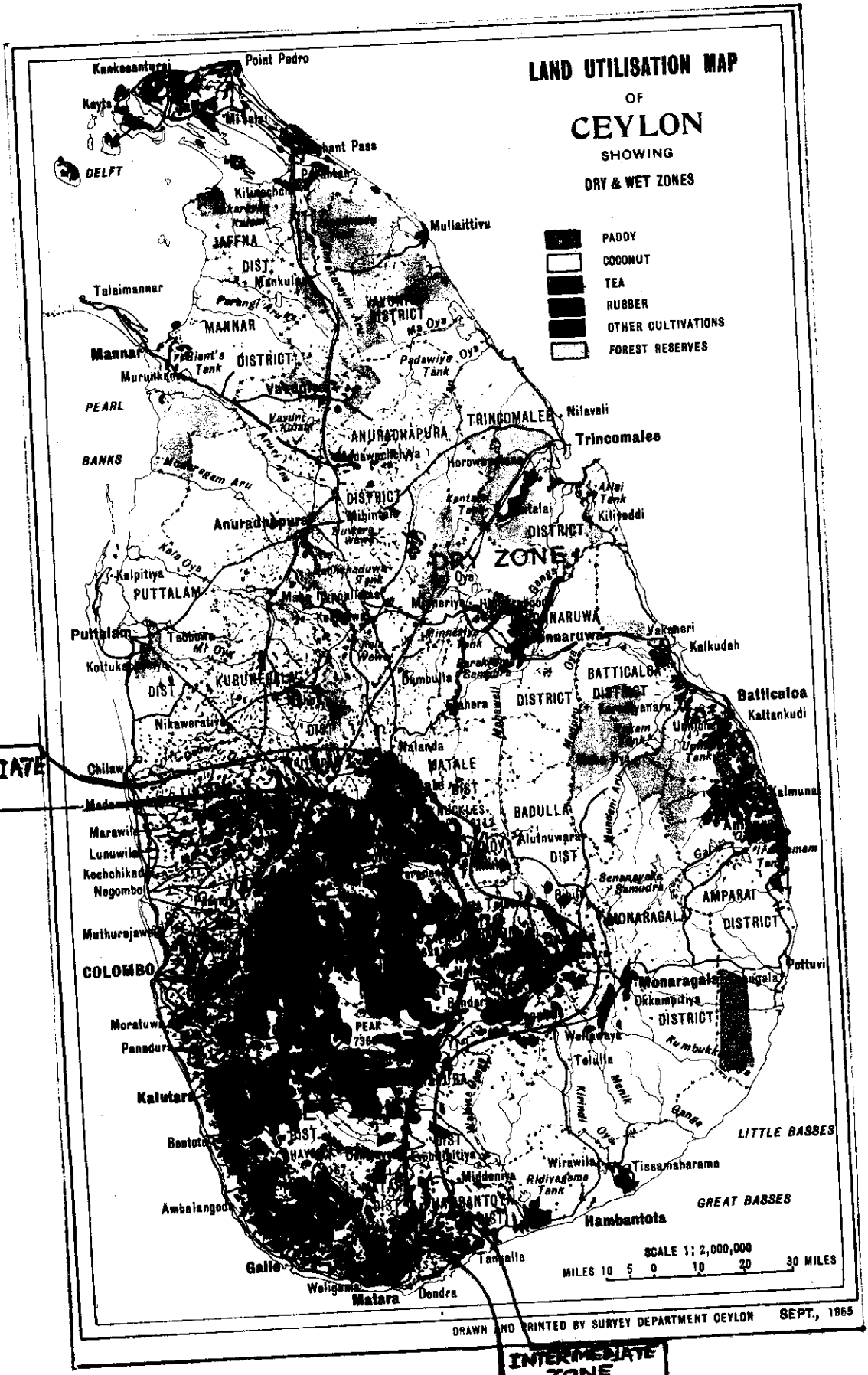
(1) The Ceylon Economy

The island of Ceylon is an import-export oriented agricultural economy heavily dependent on its export trade in the primary products tea, rubber and coconut, for its national income. The value of agricultural exports constituted 93% of total export earnings during 1962 (1 ; p 20); it remained as high as 89% even by 1968 (2 ; p 251). The fact that during 1968 manufacturing industry contributed only 7% to total Gross Domestic Product in real terms (2 ; p 18), is indicative of the fundamental importance of agriculture both in terms of the share of agriculture in the Gross National Product as well as of overall employment.

The agricultural sector consists of two sub-sectors, the Plantation and the Domestic. Tea and rubber production predominates in the Plantation sector which is highly modernized both in terms of its organizational structure and technology. Tea is the country's main source of foreign exchange earnings; 63% of total exchange earnings during 1967 came from tea exports (2 ; p 251). This dependence on the export of agricultural products to world markets by the Plantation sector was even greater during the late forties when the Gal Oya Valley development program was initiated.

LAND UTILISATION MAP OF CEYLON SHOWING DRY & WET ZONES

-  PADDY
-  COCONUT
-  TEA
-  RUBBER
-  OTHER CULTIVATIONS
-  FOREST RESERVES



INTERMEDIATE ZONE

INTERMEDIATE ZONE

MAP I

DRAWN AND PRINTED BY SURVEY DEPARTMENT CEYLON SEPT., 1965

The Domestic sector was a part that was 'left behind' in the growth of the economy. Subsistence paddy (rice) cultivation, the mainstay of this sector, is characterized by fragmented small holdings, a primitive technology and little incentive to modernize (3).

In sum, the Ceylon economy was one which experienced a dualistic growth pattern over one hundred and twenty five years preceding independence (from Britain) in 1947, with a traditional domestic sector vividly separated from the modernized plantation sector and, therefore, from the main influences for economic growth and development.

Today, the economy falls within the classification of a low income, less developed country with a per capita income of less than \$ 100 per annum. A steady decline in the world prices of tea and rubber after the 'Korean Boom' of the fifties and a classically high birth rate which has steadily increased the pressure of import demand, especially for rice, has led to a fundamental disequilibrium in the balance of payments (2 ; p 208) with which Ceylon is wrestling today. Over 50% of the value of Ceylon's imports was on food up to 1964. In 1968, it still remained as high as 46% (2 ; p 267) despite the government's vigorous program for achieving self-sufficiency in rice production and the import substitution of subsidiary food crops.

Climatically, the Island can be divided into three broad regions; the wet, the intermediate and the dry zones (see Map I). The dry zone wherein the scheme under consideration is

situated was, at the time of its inception, very sparsely populated. The Gall Oya Valley was a mass of thick jungle which shrouded the ruins of an ancient civilization with a network of irrigation tanks, ditches and channels which had long fallen into disuse. This area of the dry-zone experienced severe floods during the period of the north-east monsoon (Nov to Feb), but little rainfall during the rest of the year. It was also a malaria infested region to which few people dared to venture.

(2) The Gal Oya Valley Development Program

The Gal Oya Valley (GOV) development program commenced in 1949 was the first major multi-purpose river basin development scheme in Ceylon intended primarily to provide flood protection and irrigation water for the year round cultivation of this dry zone valley region. It involved the shift of mainly traditional peasant farmer families from relatively over-populated areas in the country to new settlements in the GOV.

A variety of goals and objectives were voiced in Parliament in 1949 when it considered the undertaking of this program. Firstly, there was the desire to expand the area of cultivation by the 'conquest' of the dry zone and the development of dry zone agriculture. Secondly, it was considered necessary to widen employment opportunities and reduce the pressure of over-population in the traditional rice growing villages by peasant colonization and settlement. Thirdly, there were the considerations of national security, viz., of building a bulwark

in the east coast against the influx of illicit Indian immigrants. Fourthly, there was the objective of increasing the domestic output of rice and the power generating capacity of the country.

However, according to a directive issued by the Minister of Agriculture and Lands in December, 1949, the Gal Oya Development Board was to consider the principal objective of the scheme as the establishment within its Area of Authority "the maximum number of families of Ceylon citizens that the Area can carry at a reasonable standard of good and comfortable living conditions" (4 ; p 134).

(3) The Gal Oya Development Board

The establishment of the scheme was placed under the overall authority of the Gal Oya Development Board (hereafter referred to as the Board), a public corporation created in 1949 by Act of Parliament to undertake regional resource development through river water control, land conservation and peasant settlement. This special form of organization, outside the normal administrative arms of the government, was intended to combine flexibility of operation with the strength of government backing, and to facilitate unified development of the entire river basin, much on the lines of the Tennessee Valley Authority in the United States.

The Act of Parliament which created the Board, specified that its functions were to develop the undeveloped GOV region by operating schemes of irrigation, water supply and drainage, the control of floods, fisheries, forest development and soil erosion

and, in general, by the agricultural and industrial development and economic and cultural progress within the entire Area of Authority (see Sec 8 of Pt. II of the Act of Parliament in Appendix II).

These activities of the Board were to be managed by a team of three members, all politically appointed, one of whom is designated 'Chairman'.

(4) The Gal Oya Project Evaluation Committee And Its Terms of Reference

An evaluation of this program was undertaken only in 1968 when the Gal Oya Project Evaluation Committee (GOPEC), headed by Mr. B. H. Farmer of the University of Cambridge, England, was set up by the Minister of Irrigation to "undertake an evaluation of the Gal Oya Project which would ascertain the economic and social returns to investments, and provide guidance for future development projects of a similar kind" (4 ; p 1).

The GOPEC defined these terms of reference broadly when it held that "The Committee, given its terms of reference had no doubt that it was the effect on the national economy, rather than on Board or Government revenue, with which it primarily would have to be concerned: That is with the social return or the return to society as a whole, on the investments made" (4 ; p 15).

(5) The Method Of Analysis Adopted By The GOPEC

The evaluative approach of the GOPEC was primarily one of benefit-cost analysis. It applied this technique to assess the net returns to society from a variety of separate activities conducted by the Board, viz.,

- (a) the consequences of opening up and the irrigation of new land,
- (b) the consequences on the lands cultivated before the project was introduced,
- (c) the sugar complex,
- (d) power generation,
- (e) the milling of rice,
- (f) the tile factory, and
- (g) the wood working industry,

and subsequently aggregated the entire costs and the gross benefits to arrive at an overall benefit-cost ratio for the GOV development program.

The evaluation of the program was done during 1966-68, approximately seventeen and a half years after the Gal Oya Valley scheme was initiated (in 1949) and the major expenditures were all incurred. However, the benefit-cost analyses were carried out on the (unstated) assumption that the Committee were viewing the future up to a 50 year period ahead from the time point of the financial year 1949/50. Accordingly, all costs and benefits were discounted to this common time point. Nevertheless, the data used up to the financial year 1965/66 are 'ex-post', while 'projections' are only in respect of the period 1966/67 to 1998/99.

The GOPEC have, in Chapter 10 of the report (4), also made some brief statements on (a) the financial return to outlay, (b) the employment aspects and the standard of living of the colonists, (c) assets created by the Board, and (d) intangible benefits.

(6) The Major Findings of The GOPEC

The benefit-cost ratio for the GOV program was estimated to be 0.5. Only the benefit-cost ratio in respect of primary

production in the Purana (ancient) lands that are privately owned and managed was found to be positive; all of the economic activities under the control and direction of the Board were found to be a drain on the national economy (see Table I).

TABLE I

Gal Oya Valley Development Program:
Benefit-cost Ratios

	<u>B/C</u> <u>Ratio</u>	<u>B - C</u> <u>Rs. mln.</u>
1. Primary production; irrigation, colonisation and village expansion.....	0.43	-159.5
2. Primary production; the Purana lands....	1.40	21.0
3. The Sugar Project.....	0.22	- 85.3
4. Electrical Power.....	0.44	- 21.0
5. Rice Milling.....	0.26	- 3.3
6. Woodworking Industry.....	0.61	- 5.1
7. Brick and Tile Factory.....	0.45	- 2.6
8. OVERALL PROGRAM	0.50	-277.3

(7) The Objectives of This Paper

The main objective of this paper is to critically examine the GOPEC's evaluation of the peasant colonisation segment of the GOV program, "the core of the problem that this committee was called upon to report" (4 ; p 140). This examination is intended to ascertain whether the benefit-cost assessment of the GOPEC was, in fact, correctly executed, and to see whether the main policy conclusion of the GOPEC with regard to peasant colonisation - that "policy makers take a long, hard look at the advisability of diverting resources to what is essentially a social welfare function in an economy where the greatest need is to maximize production" - (4 ; p 140), follows from the GOPEC's analysis.

The second objective is to determine whether benefit-cost analysis was adequate for providing guidelines for the formulation of national policies in regard to the strategy of agricultural development within Ceylon; more specifically, for the rejection of peasant colonisation as a strategy of agricultural development, and to suggest a more appropriate framework for the evaluation of on-going peasant colonisation settlement projects in Ceylon.

II - THE GOPEC'S BENEFIT-COST ANALYSIS OF PEASANT COLONISATION AND SETTLEMENT IN THE GAL OYA VALLEY - A CRITIQUE

(1) Sub-Projects Within The Colonisation And Settlement Segment Of The GOV Program Have Not Been Clearly Identified

Chapter 5 of the GOPEC's report examines the relationship between benefits and costs from colonisation and settlement in the GOV. Here, the GOPEC shows that investments in colonisation and settlement in the form of clearing jungle land, demarcating lowland rice cultivation tracts and homestead allotments, the provision of irrigation facilities and dwelling houses and the like, were not worth the costs incurred. The proof for this ^{is} given in the benefit-cost ratio of 0.43 that has been arrived at for this segment of the program.

However, the GOPEC have not defined the sub-projects that exist within this segment of the program clearly. Different types of colonisation settlements have been established within the Valley, several at different stages of development as at the time of the evaluation. Firstly, there was the first phase of colonist settlement in the first forty Village Units on the left-bank (see Map III at end) in accordance with the original directives of Parliament, which constitutes a separate project within the GOV development program. Secondly, there are the Village Expansion schemes, also within the left-bank region, where lands originally reserved for pastures and forest lands were parcelled out to the sons of settlers under different terms and conditions than the previous colonisation project. Thirdly, there is the Namal Oya scheme close to the main reservoir which, despite a heavy capital

expenditure on the construction of the Namal Oya Tank, failed to provide irrigation water to settlers satisfactorily even up to the year 1969, on account of faulty engineering works. In fact, the 'so-called' settlers are not in residence within the scheme but visit it during the rainy season to raise a Maha (rain-fed) crop each year. This, too, is a clearly separable project within the colonisation and settlement segment of the GOV program.

Fourthly, there is the advanced alienation ⁽¹⁾ schemes on the right bank where water is not flowing down the field channels and the settlers are dependent on rain water for a single crop each year. These projects not only have insufficient irrigation facilities but also poor roads and other facilities for the purchase of production inputs or the sale of any surplus produce. Finally, there is the middle-class colonisation settlement with fifty allotments of twenty five acres per farmer, of which, only one resolute farmer lives within his allotment and cultivates a small proportion of the farm each year under severely adverse conditions. "Most of the of the original allottees have abandoned their land, partly at any rate because of the remote position of the colony and the poor state of maintenance of irrigation channels". (4 ; p 39).

Appendix D of the GOPEC's report indicates that all these separable projects or sub-segments have been lumped together under "Irrigation, Colonisation and Village Expansion" (4 ; Chap 5) without careful definition of each of the components

(1) Where colonists are brought in even before irrigation or other facilities are made available, on the basis that colonists have the opportunity to participate in the development of the land and the settlement project.

of this segment of the GOV colonisation program. One cannot correctly arrive at definitive conclusions in regard to the benefits and costs of colonisation and settlement on the basis of a composite benefit-cost ratio for a heterogeneous set of activities or projects, each of a different nature and at a different stage of development.

The main thrust of colonisation and settlement in Ceylon has been towards that of relieving landlessness, unemployment and poverty (4 ; pp 7 and 42).⁽¹⁾ The middle-class settlement, the first experiment of this kind in Ceylon, does not belong to this class of colonisation. It has been a dismal failure in terms of the increase in agricultural output that has resulted. However, when the GOPEC refers to colonisation and settlement, the general impression created is that peasant settlement has been a failure. This mis-representation of the actual situation flows out of the GOPEC's failure to define the components of this segment of the program carefully.

A discussion of the difference between the concept of a 'program' and that of a 'project' is likely to bring out this implication more clearly. A 'program' aims at achieving a variety of goals. The multi-purpose Gal Oya Valley river basin development scheme is by definition a multiple-goal oriented program (see Chap I, sub-section 2 above). Beneath each of these broad goals lie a variety of specific objectives. A 'project' is more limited in coverage than a program; it is a set of activities around which

(1) The Six-Year Programme of Investment -1954/55 to 1959/60 of the Government of Ceylon holds (at page 170) that "The land policy of the government has (accordingly) been directed towards the maximum utilization of the available land resources in a manner that would tend to increase our supplies of rice, increase employment opportunities, reduce the incidence of rural under-employment and relieve rural landlessness".

physical and conceptual boundaries can be specified so as to identify it clearly in terms of location, a common clientele to which it is addressed, a specific set of objectives, a homogeneous group of benefits and costs, a common time sequence for the variety of activities initiated and the investments made, etc.

Unless these boundaries are clearly defined and each separable project reduced to manageable size, one cannot make a realistic economic evaluation nor assess whether the initial objectives were being achieved in an on-going program, and at what cost. The middle-class scheme, for example, is conspicuously different from the peasant colonisation projects, as is the first phase of peasant settlement (first forty Village Units on the IB) from the Village Expansion schemes, the Namal Oya scheme and the Advanced Alienation schemes, etc. Eliminating the benefits and costs of the Middle-Class and Advanced Alienation schemes from the rest of the colonisation segment of the evaluation may have shown peasant colonisation in a better light than has been indicated in the GOPEC's analysis.

Even within the peasant colonisation segment, the Namal Oya scheme is unrelated to the first phase of peasant settlement in the first forty Village Units on the left bank, in terms of objectives, its clientele, physical boundaries and facilities, the time sequence of its implementation, etc. Given the very low level of productivity within the Namal Oya project, one can be fairly confident that the benefit-cost ratio on the first forty Village Units would rise substantially if the former were separated out.

A composite benefit-cost ratio is incapable of giving any indication as to why a development program is desirable or undesirable, whether and why it yields a return less than its costs and other important issues that lie behind the ratio. In the GOPEC's evaluation, one cannot say which projects have a favourable benefit-cost ratio and which do not. It may be that just one or two of these separate colonisation projects depress the composite ratio; and it may be that those projects were poorly conceived and improperly implemented, or have yet to be completed before any substantial benefits are to be obtained.

It may thus be observed that despite the GOPEC's confinement of the evaluation to the limited yardstick of economic profitability, it has still failed to identify which of the various colonisation projects are unprofitable, and why. Thereby, it has failed to provide policy makers with the evidence necessary to make informed judgements regarding the relevance of peasant settlement as a strategy of agricultural development.

(2) Incorrect Identification Of Benefits And Costs

(a) COSTS

(i) Improper identification of the sub-projects have led to the inclusion of benefits and costs that do not belong to the colonisation and settlement segment of the program. The costs included in the evaluation of this segment contain expenditures on (1) the Gal Oya Valley Food Production

Company, an expensive attempt by the Board at mechanized cultivation (4 ; p 11), and (2) another costly venture in the lift irrigation of subsidiary food crops, both of which are different sets of projects that cannot be aggregated under colonisation and settlement.

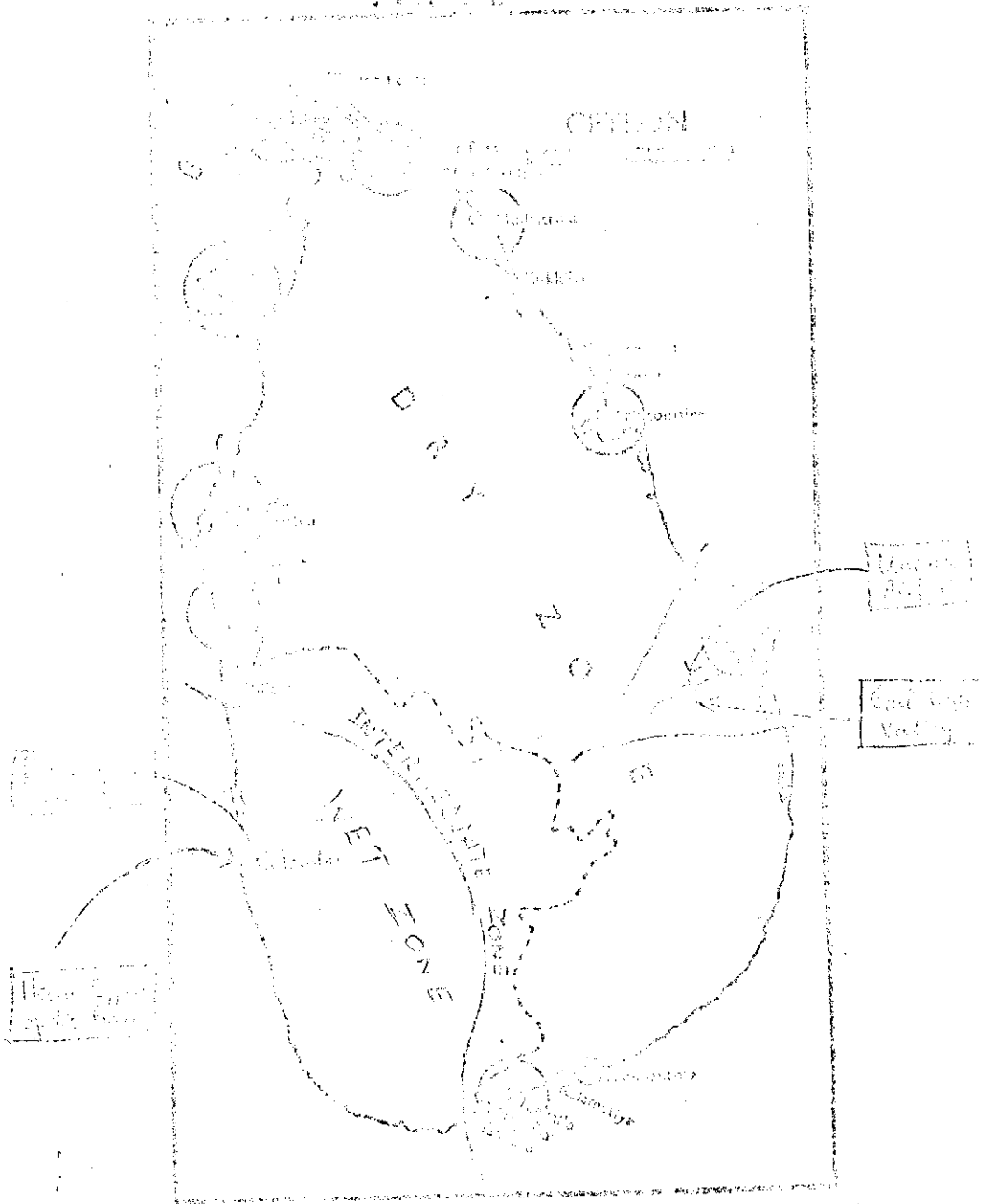
(ii) A series of other whimsical ventures of the Board which were abandoned after a few years of such experimentation have been counted as falling within the colonisation segment, viz., the Animal Breeding Centre, The Fresh Water Fisheries and the Coconut Plantation (4 ; p 147 and p 11). All these ventures were expensive failures a few years after implementation (5 ; p 68). They were initiated without a proper understanding of the physical characteristics of the dry zone region and the economic implications of the investments. For example, the Board even went to the extent of bowsering water from the irrigation channels at heavy expense merely to keep the coconut plants alive during a prolonged drought, an occurrence which is not rare in the GOV. The settlers obtained no benefits from these projects that were initiated by the Board. The question arises then of the basis on which the GOPEC classified such expenditures under the head of colonisation.

(iii) It is also unacceptable that the expenditure defined as "other cultivation and research" in Table 5/2 (4 ; p 45), belongs to this segment of the program since this research was not directed towards helping the colonist farmer. It is known by the author that this expenditure was on the 'Malwatte Research Station' which was far removed from the colonisation region both in a physical sense as well as in terms of the link between research and extension. The costs of this research, which was not directed

towards solution of the problems encountered by the colonist farmer in his agricultural activities, cannot be rightfully considered as part of the costs of colonisation and settlement. The function that this research station really performed was that of test cultivating different types of plants and seed under different methods of cultivation, and the sale of the produce to Board officials at subsidized prices. There were no efforts made at economic evaluation from the farmer's standpoint, nor at passing down the results of such research through the extension service (perhaps, because there were no worthwhile results). It was usually the case that the extension division and the experiment station were officially antagonistic such that the benefits of research, if any, never reached the farmer. Before the entire expenditure on 'other cultivation and research' was apportioned to the colonisation segment of the evaluation it was necessary that the GOPEC should have ascertained the extent to which these costs were in direct support of colonisation agriculture. This was not done; such expenditure cannot be accepted as part of the costs of colonisation and settlement 'in toto'.

(iv) Reference is drawn to (1) the "Highly costly items identifiable from the Tables" referred to at page 35 of the GOPEC's report, (2) the items (i) "proportion of GOPEB administrative expenses" and "the maintenance of heavy machinery", items 1 and 3 respectively of Table 5/1 at page 44 of the GOPEC's report (4). Commonsense would indicate that Rs. 40 mln. "amounting to more than twice the amount apportioned to colonisation and village expansion in respect of the main dam" (4 ; p 35), could not have been incurred on "office and other buildings, and residential

MAP 22



The ... Zone ...
 The ... Zone ...
 The ... Zone ...

quarters" merely to support the process of colonisation and settlement alone. These are expenditures relevant for a variety of other aspects of the program, too. However, no part of it has, for example, been debited against the development of the Purana lands (4 ; Chap 6) though part of these expenses have, in fact, been incurred on administrative facilities pertaining to construction works that benefited such lands.

The administration expenses of the Board include large expenditures on travel, entertainment and accommodation of politicians, Chairmen and Members of the Board (who changed from time to time), Board officials, etc., all of which is unrelated to colonisation and settlement. Why this component of administrative expenditures is high could be ascribed to at least three reasons:-

- (1) the Head Office of the Board is situated in Colombo on the west coast of the Island (see Map II), approximately 170 miles away from the project area situated on the east-coast of the Island. Members of the Board and Board officials, both at Gal Oya and the Head Office, travel to and from the area constantly for Board meetings and other 'important' business, on official account.
- (2) The GOV with its scenic lakes, wild life reservations, bird sanctuaries, commodius lodging houses and circuit bungalows, are a set of national showpieces to which foreign dignitaries, diplomats, scholars etc. are taken to with the lavish hospitality of the Board.
- (3) The Board maintains an expensive Telex message service and a Radio message outfit between Colombo and the Project Area,

both of which are little used for the service of the colonist farmer.

A large proportion of the above "administrative" expenses do not constitute operating expenses of the colonisation projects. But, the GOPEC have mechanically apportioned total administrative costs without drawing attention to these aspects, and without itemizing the expenditures in detail. Perhaps, the problem should have been approached by ascertaining the services that were actually provided for the colonisation settlements and of calculating the administrative cost component from below. The GOPEC made no such attempt.

(v) The main phase of colonisation and settlement in the left bank was over by the end of the fifties (5 ; p 8), but the costs of maintenance of heavy machinery, vide item 3 of Current Expenditure in Table 5/1 (4 ; pp 43-44), have continued to rise right up to 1961/62, and have remained at a high level until 1965/66 (the cut-off point for actual cost data used on the evaluation). It cannot be accepted that these expenditures have all been on colonisation and settlement since there has been very little work on the part of the Equipment Branch in the colonisation region since the early sixties. Much of the expenditure on this account was in reality on the development of the Right Bank and cannot be assigned 'in toto' on the colonisation projects, especially the entirety of the costs recorded after the major construction activities connected with colonisation and settlement were completed.

Most of these lapses of the GOPEC flow from the initial mistake already pointed out; the failure to identify the

sub-projects within this segment. As a result, they failed to ask the right questions on how and why certain expenditures on travelling, accommodation and entertainment, highly unconnected to colonisation and settlement; instead, the GOPEC have categorized expenditures under a few broad heads to compute a benefit-cost ratio of doubtful validity. The question arises as to whether this is a proper use of the benefit-cost technique.

(vi) The costs incurred on the Namal Oya settlement project are in reality a price paid for poor engineering skills in planning, designing and constructing the project. This tank had been so built that over 50% of its capacity must remain as dead storage; rain water should fill more than half the tank before the channel system can be fed. Recent efforts at tapping this dead storage by re-designing the field channel system still proved futile since farmers could not afford the costs of pumping water onto higher ground. But, when national elections are near, the Board has been generous in providing oil pumps to settlers without any charges being levied for their use. All such costs have been tagged on to the costs of colonisation and settlement without careful investigation.

(vii) The GOPEC's computations of 'associated costs' have been made on insufficient data. They were collected from a rapid survey of a few selected farms during the 'Yala' season (1)

(1) There are two seasons; the Maha and the Yala. To the average farmer, the Maha season constitutes the main cultivation season on account of the greater availability and reliability of irrigation water.

more as a "rescue operation" where "it was not possible to question more than three colonists in each unit so selected; and they were chosen for convenience of access, so that the sample within the unit, though not biased in favour of types of colonists, was not strictly a random sample and only covered some 2% of colonists" (4 ; p 30). What has not been mentioned, however, is that this survey covered only the main settlement region on the left-bank region on the left-bank and not the Namal Oya settlement, the Village Expansion units, the Advanced Alienation schemes nor the Middle-Class colony.

Thus, in addition to the lack of representativeness of the data in respect of the main settlement on the left-bank itself, these data on "associated costs" are not valid for the other settlement projects as well. Yet, the same value of costs per acre has been used for the entire project area despite a great diversity of physical conditions and levels of development, as well as the great variations in facilities available between sub-projects.

(viii) The GOPEC's avowed intention was to identify the social costs and returns of the program rather than the purely financial (4 ; p 15). However, no adjustments have been made in respect of the labour cost component in project construction, operation and maintenance, despite the fact that there has been a high level of un and under-employment within the region since the inception of the scheme in 1949. No doubt skilled labour was in short supply, but labour costs include a very high component of unskilled labour paid at government established rates of minimum

money wages. On the contrary, family labour and hired labour, as well as buffaloes and cart transport, have been emphatically excluded from the computation of associated costs on the vague assumption that "for the Valley as a whole, expenditure on these is probably just about balanced by income from them not recorded in the evaluation" (4 ; pp 32-33). It is pointed out, however, that not all labour associated in cultivation can be shadow-priced out of the benefit-cost computation since severe labour shortages are experienced during peak periods of cultivation both at the beginning of the paddy cultivation season and at harvesting time (5 ; pp 30 to 49). Furthermore, buffaloes and cart transport are relatively scarce forms of capital for the farmer during periods of preparatory tillage and harvesting. Yet these items, too, have been excluded in the computation of "associated costs".

(ix) Colonisation Units 1 and 2 on ^{the} left-bank region (see Map III at end), treated as a part of the colonisation settlement segment by the GOPEC, is really settled with aboriginal jungle dwellers (Veddahs) who had been cut off from modern civilization for well nigh a century. They were, in fact, discovered during the reconnaissance part of this dry zone program and forcibly re-settled near the main reservoir (5 ; pp 8 & 93-94). They are not used to a settled agriculture, and still persist in neglecting their fields for hunting and other pursuits of a primitive nature for their sustenance. Their level of agricultural productivity is absurdly low (5 ; p 94), and the costs of their re-settlement have been relatively higher than the normal settlers in that they have been given larger allotments and more reservation (forest) land to

compensate for the loss of their jungle lands inundated by the main reservoir. Undoubtedly the cost of settling these folk is part of the cost of settling these folk is part of the costs of colonisation and settlement differently defined; but not in entirety. Their low level of agricultural productivity is a built-in recurrent cost, or charge, which should not be tagged entirely on to the normal colonisation and settlement projects, as has, in fact, been the case; for, the cost of re-settlement of these jungle dwellers is a price being paid for the GOV development program as a whole. The benefit-cost ratio on colonisation is likely to be unduly depressed thereby. It was necessary to have treated this aspect of the program as a separate item of cost and have apportioned it proportionately among the various other projects within the development program, only one of which is colonisation and settlement.

(x) Finally, the GOV development program which aimed 'inter-alia' at flood protection and colonisation, also resulted in water logging at the lower reaches of the Valley such that lands that were cultivated during the pre-scheme era became uncultivable. However, the GOPEC have not considered it necessary to apportion a part of these costs to the colonisation segment of the program. One of the major objectives of the program was the establishment of peasant colonists, and part of the costs of achieving this objective was the loss of already cultivable land. If so, a proportion of this cost should have been apportioned to the colonisation segment of the scheme. This, the GOPEC have failed to do: It is procedurally incorrect in benefit-cost analysis.

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(b) BENEFITS

The most important stream of economic benefits from colonisation is agricultural production. Agriculture in the Valley is synonymous with paddy (rice) cultivation in the irrigable lowlands. The reason for this lies in that the highlands are unirrigated; and without irrigation water, highland cultivation is not profitable. Because paddy is purchased by the government under a guaranteed price scheme and has a ready market it is the most profitable crop for the settler. In the assessment of benefits, it was necessary to have ascertained clearly how productivity in paddy cultivation was likely to rise in the future. The GOPEC merely assumed that the yield per acre of rice cultivated will increase only up to 50 bushels to the acre by 1976/77 and remain constant thereafter. (4 ; pp 33 & 145). This assumption has been made purely on the basis of soil conditions within the Valley. What they failed to perceive (partly because there was no Agricultural Economist on the team) was that new technology had already caused revolutionary changes in rice production long before the GOPEC's work was ended. Firstly, the production of chemical fertilizers - nitrogen, potash and super-phosphates - had already developed substantially in the Island. The national average yield of rice per acre was rapidly rising with the greater adoption of chemical fertilizers. The "Constable and Wijewickrema" fertilizer trials on the fields of dry zone farmers under the "Freedom From Hunger Campaign" had given conclusive proof that the local hybrids of rice - H₄ and H₈ - could be made to yield double the current average by doubling the dosage of the standard quantities of fertilizer recommended by the Department of Agriculture in 1965/66. By

1966/67, the increased use of chemical fertilizers was well under way (See Table II). Only the lack of credit facilities and inefficiencies in the transportation and distribution system checked further increases in the rate of adoption.

Secondly, the IRRI varieties developed at Manila had revolutionized paddy culture to the extent that the 'Green Revolution' had become a by-word in Asia. This new technology in paddy cultivation was being used even in the GOV by 1967/68, and yields of over 150 bushels to the acre were not uncommon. The GOPEC have failed to observe these technological developments and have not perceived the potential for vastly increased yields. As a consequence, the importance of re-vitalizing the extension division and the need for an on-going program of basic and adaptive research within the scheme itself was not recognized.

Since the GOPEC failed to observe these potentialities, the future stream of potential benefits was underestimated substantially. Table 19 (4 ; p 18) shows that with effect from 1976/77, the value of paddy output has been held static on the basis of a constant yield right up to the end of the assumed period of life of the project.

(3) The 'With-Without' Principle Has Been Flouted

In the evaluation of the purana lands, the GOPEC have credited this project with the entire increase in output on the argument that "....the cultivators of the 'purana' fields would not have used those inputs necessary to increase yields unless they were

confident of adequate protection from floods" (4 ; p 54). In other words, the rise in yields that has occurred within this project (the privately owned, purana lands project) is held to be a direct consequence of the GOV development program.

It may, however, be contended that this growth in yield per acre was, in fact, part of a national trend, as the data below (Table II) would seem to indicate, consequent upon the increasing availability of chemical fertilizers, the propagation and distribution of better varieties of seed paddy by the Department of Agriculture, the increased quantities of production credit supplied to farmers and medium and long-term credit to co-operatives and cultivation committees, the growing effectiveness of the Paddy Lands Act of 1958 by which tenant farmers were provided security of tenure and their share of the harvest was raised to the level of three-fourths the crop, the working of the guaranteed price scheme for rice, measures to provide Crop Insurance to small farmers, etc. (42).

TABLE II
CREDIT, FERTILIZER USE AND PADDY YIELDS IN CEYLON

Financial Year	Prodn. Credit (Rs mln)	Fertilizer Use (,000 tons)	Yield p ac (bushels)	
			Maha	Yala
1	2	3	4	
1950/51	Nil	2.6	18.0	15.0
:	-	-	-	-
:	-	-	-	-
1959/60	-	20.1	-	-
1960/61	11.4	29.0	-	-
1961/62	12.6	38.1	-	-
1962/63	10.7	47.1	-	-
1963/64	34.6	60.1	-	-
1964/65	27.6	42.1	34.1	34.7
1965/66	28.1	40.5	35.9	35.0
1966/67	32.3	52.9	40.8	42.0
1967/68	-	84.2	47.5	44.5

Sources:- (2 & (3) from the Administration Reports of the Commr. of Agrarian Services, Cey. (4) from "Economic And Social Progress" issued by the Ministry of Planning, Cey.

Secondly, the contention of the GOPEC that it was the provision of flood protection that induced the adoption of the modern inputs is not totally valid because floods visited this region only during the period Dec to Feb, and the adoption of modern inputs during the rest of the year was not dependent upon the provision of flood protection. As a result of crediting this project with the entirety of paddy yields in contravention of the 'with-without' principle in benefit-cost analysis, the GOPEC inflated the benefits accruing to the 'Purana' lands project.

(4) The Assumed Period Of Project Life Has Been Unduly Restrictive

The period of assessment of benefits and costs has been limited ^{to} fifty years - from the financial year 1949/50 onwards when the construction of the main reservoir was commenced. The basis for a fifty year limit has been stated to be that "It is generally accepted practice to assume a 50 year 'life' for irrigation projects, largely on the argument that if a project has not justified itself in the period, then it is unlikely to ever to do so" (4 ; p 18).

This argument is fallacious. A capital intensive project of this nature with a low O/K ratio ⁽¹⁾ can seldom expect to justify itself in the first fifty years, especially in a less developed country like Ceylon where a whole series of other developments are necessary before the full benefits of the program

(1) A meaningful O/K ratio cannot be computed from the data at page 141 of the Gopec's report since Current costs include a variety of expenditures which do not constitute operating and maintenance costs.

can be reaped. The GOPEC have, however added that "There can be no doubt, it should perhaps be stressed, that the Gal Oya irrigation scheme might function long after the year 1998" (4 ; p 18) meaning that they have been purposefully restrictive in regard to the period of assessment. The question is, why limit the evaluation to only fifty years ? As Eckstein holds, "the more durable a project, the larger will be the stream of benefits which cannot be included in the analysis" (6 ; p 83); if so, it is essential that such a project should be given credit to the maximum length of time consonant with a prudent economic evaluation.

The theoretical justification for a specific period of life in benefit-cost analysis is to facilitate comparison between projects and to guard against risk and uncertainty in the estimation of benefits and costs: NOT because of the argument that is put forward by the GOPEC, viz., that if a project has not justified itself in fifty years, it is unlikely to ever do so. If we accept the argument that one reason for restricting the period of analysis is on account of the uncertainties associated with the future streams of benefits and costs, there was less reason for the GOPEC to have limited the period of assessment in the Gal Oya case since it was making an assessment of a scheme that was already under way for sixteen to nineteen years, and 'projections' into the future were necessary for a period of time lesser than would normally have been the case if it was as assessment before the program was undertaken.

It is argued that uncertainty of the future with regard to the benefits and costs on an agricultural project of this nature in Ceylon can be considered fairly low on account of the

following reasons:-

Firstly, the country is committed to the development of the domestic agricultural sector for the diversification of the economy away from tea and rubber (7, 8 and 9), to bridge the gap between the Plantation and Domestic sectors, to alleviate poverty, to relieve landlessness and unemployment, to maintain political stability and to increase foreign exchange savings (7 and 10). Secondly, the demand for agricultural products is likely to continue to rise on account of increasing population pressure and the high income elasticity of demand for foodgrains, given current levels of income, as development gets under way.

Uncertainty then would only seem to stem from technological change that may make this form of irrigation obsolete. However, the problem of capital availability is so acute and likely to be prolonged such that there seems to be little likelihood of the adoption of new technology in irrigation as rapidly as they become known. The only uncertainties that would remain would be from chance or random elements. But, such uncertainty exists in any form of economic activity; it is not unique to the case of the Gal Oya program. It is, therefore, argued that the limitation of the period of the GOPEC's benefit-cost assessment of the GOV development program was capricious (6 ; p 85).

(5) The Rate of Discount Has Not Been Justified

In an economy where indigenous private enterprise was absent at the time the GOV development program was undertaken;

TAF 1988

External Assets

End of period	Government (a)	Government securities and investments (b)	Current Transfer Payments (c)
1987	150	100	100
1988	150	100	100
1989	150	100	100
1990	150	100	100
1991	150	100	100
1992	150	100	100
1993	150	100	100
1994	150	100	100
1995	150	100	100
1996	150	100	100
1997	150	100	100
1998	150	100	100
1999	150	100	100
2000	150	100	100
2001	150	100	100
2002	150	100	100
2003	150	100	100
2004	150	100	100
2005	150	100	100
2006	150	100	100
2007	150	100	100
2008	150	100	100
2009	150	100	100
2010	150	100	100
2011	150	100	100
2012	150	100	100
2013	150	100	100
2014	150	100	100
2015	150	100	100
2016	150	100	100
2017	150	100	100
2018	150	100	100
2019	150	100	100
2020	150	100	100
2021	150	100	100
2022	150	100	100
2023	150	100	100
2024	150	100	100
2025	150	100	100
2026	150	100	100
2027	150	100	100
2028	150	100	100
2029	150	100	100
2030	150	100	100
2031	150	100	100
2032	150	100	100
2033	150	100	100
2034	150	100	100
2035	150	100	100
2036	150	100	100
2037	150	100	100
2038	150	100	100
2039	150	100	100
2040	150	100	100
2041	150	100	100
2042	150	100	100
2043	150	100	100
2044	150	100	100
2045	150	100	100
2046	150	100	100
2047	150	100	100
2048	150	100	100
2049	150	100	100
2050	150	100	100

of Capital

Commercial Bank(s)	Total External Assets	Current Transfer Payments
1987	150	100
1988	150	100
1989	150	100
1990	150	100
1991	150	100
1992	150	100
1993	150	100
1994	150	100
1995	150	100
1996	150	100
1997	150	100
1998	150	100
1999	150	100
2000	150	100
2001	150	100
2002	150	100
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2021	150	100
2022	150	100
2023	150	100
2024	150	100
2025	150	100
2026	150	100
2027	150	100
2028	150	100
2029	150	100
2030	150	100
2031	150	100
2032	150	100
2033	150	100
2034	150	100
2035	150	100
2036	150	100
2037	150	100
2038	150	100
2039	150	100
2040	150	100
2041	150	100
2042	150	100
2043	150	100
2044	150	100
2045	150	100
2046	150	100
2047	150	100
2048	150	100
2049	150	100
2050	150	100

100 of 100

where the levels of unemployment and under-employment have been continuously high from even the time of the inception of the program right up to the time of the evaluation; where governmental intervention in public projects was necessary to reduce the imbalance between the modern and traditional sectors, conquer the dry zone, extend the area of cultivation and also relieve some of the pressures of rapid population growth; where there were sufficient external assets (see Table III, p 29) at the command of the government to undertake such a program, the relevant criterion for the initial period of the program was primarily, if not solely, that of the opportunity cost of those external assets. External assets which were utilized to meet the capital expenditure on the program were locked away in British banks earning interest at the going rates - 3 to 5%. It is an average of the actual rates that were being earned that was relevant for discounting benefits and costs during the early stages of the project.

The situation had changed somewhat radically by the time this evaluation was undertaken. Ceylon was (is) in the throes of a balance of payments problem; foreign exchange was (is) extremely scarce, but not crucial for this program since the major capital expenditures involving foreign exchange costs had already been incurred; rates of return on private business activities were (are) fairly high because the economy was (is) operating under severe restrictions on imports of any kind.

However, social benefit-cost analysis is predicated on the basic assumption of competitive equilibrium within the entire economy, and that the cost of factors have to be adjusted in such

an evaluation to reflect the social, rather than the monetary, costs of these factors. But, determining what this rate should be under the conditions that prevail within the country is, as Prest and Turvey hold (11), like attempting to unscramble an omelette. Not only have adjustments to be made to come close to the price of capital which reflects the social cost of capital, there are also considerations of distributive justice, poverty and unemployment, in accordance with the goals and objectives of Ceylonese society. The norm of economic profitability is not the whole thing. If as Baumol argues (12 ; p 203), the rate of discount determines the allocation of resources between the public and private sectors, then a high discount rate means signalling that less funds should be diverted to public programs that benefit the poor, which is synonymous with neglecting the peasant farmer. A high discount rate under conditions such as in Ceylon means more funds to the commercial sector rather than to industry (or agriculture), for little industrial activity prevails.

Whatever the rate should be after the period when external assets had been run down, the main criticism of the GOPEC's application of a 10% rate of discount is that the assumption has been made on flimsy grounds and for its adherence to this single rate with a sense of finality: The GOPEC have been emphatic in maintaining that 10% and nothing but 10% is "the minimum rate of return accepted by this Committee" (4 ; pp 72, 77 etc. on the discount rate). It concedes, however, that this rate "...may seem high" (4 ; p 19), but insists that this is the rate which represents the opportunity cost of capital in Ceylon since it was "...the rate

which emerged from a survey of the unorganized sector of the capital market conducted by the Central Bank..." (4 ; p 19). It is not clear how the rate of interest prevailing in the 'unorganized sector' of the capital market, whatever it may mean, can be held to be the true indicator of the opportunity cost of capital in Ceylon; there is nothing sacrosanct about such a rate of return.

Nor can one ^{be} emphatic about what the correct rate SHOULD be; it is only a hypothetical rate used on the basis of several assumptions. The problem of ascertaining the appropriate discount rate holds in developed economies, too, even though the price mechanism is believed to work more efficiently such that business profits may be a good indicator of net benefits. This is not the case in less developed agrarian economies such as Ceylon. Therefore, to depend entirely on the rate of return in the unorganized sector for the discount rate is theoretically unsound; to be inflexible about it is even worse. For, as Libby and Kalter hold in their paper on the Genessee River Project (13 ; p 10), any of the discount rates specified therein could have been justified.

Price Gittinger holds that "In practice, the rate chosen is simply a rule of thumb: 12% seems to be a popular choice and almost all countries seem to think it lies somewhere between 8% and 14%." (14 ; p 70). This indicates that the question of the appropriate rate of discount cannot be easily resolved and that sensitivity analysis should form an essential part of a benefit-cost analysis. The GOPEC did not resort to sensitivity analysis of the GOV development program.

In the present case, not only was sensitivity analysis necessary, but also more than one discount rate, at least two, were relevant; the rate which reflected the opportunity cost of external assets for the early period of the program, and another relatively higher rate thereafter so as to take into reckoning the greater scarcity of investment funds and the uncertainties associated with projections beyond the period 1966/67.

In an attempt to examine the sensitivity of the project to the discount rate, benefit-cost ratios were computed with discount rates ranging from 3 to 10%⁽¹⁾. The results are shown in Appendix II. They indicate that on the basis of the data computed for the benefit-cost assessment by the GOPEC, the project is economically unprofitable at any of these discount rates.

An additional set of sensitivity tests were carried out with moderate assumptions regarding costs, benefits and the time horizon. A benefit-cost ratio of more than one has been indicated only in the cases where the following assumptions were made:-

SET 'C'

Time Horizon - 50 years
 Benefits increase @ 20% w.e.f. the 29th year,
 viz., 1977/78.
 Operating costs increase similarly.
 An additional capital cost of Rs. 10 mln. was
 included during the 27th year.
 The B/C ratio is found greater than one only
 if the discount rate is less than 7%.

(1) The computer program devised by Rober F. Ranger (15), Graduate Student of the Department of Agricultural Economics, M.S.U., was utilized for the purpose of conducting these sensitivity tests.

SET 'E'

Time Horizon - 100 years
 Benefits remain constant after the 50th year
 as already assumed by the GOPEC.
 Similar assumption in respect of operating costs.
 An additional capital cost of Rs. 10 mln. was
 included every 25 years.
 The B/C ratio is greater than one only if the
 discount rate is 6% or less.

Set 'F'

Time Horizon - 100 years
 Benefits increase at 10% from the 29th year, viz,
 from 1977/78.
 Operating costs increase at 30% per year from the
 29th year and remains constant from the 50th year.
 An additional capital cost of Rs. 10 mln. was included
 every 25 years.
 The B/C ratio is found to be greater than one only if
 the discount rate is 6% or less.

The detailed results of these sensitivity tests are shown in Appendix II, but it is felt that these tests have not been too useful because only marginal changes in the existing data have been considered. It is believed that before any useful sensitivity tests are to be carried out, the entire set of benefits and costs of this segment of the program have to be recomputed.

(6) A Benefit-Cost Analysis Was Inappropriate For Evaluating The GOV Development Program

The criticisms made up to now of the GOPEC's evaluation of the GOV development program were based on the implicit assumption that benefit-cost analysis was an appropriate technique for evaluative

purposes. But, benefit-cost analysis assumes that a given program is so small in relation to the total economic activity within the country as a whole that it would not cause changes in economic variables as a consequence of its implementation, despite the full employment of economic resources. The presumption that partial analysis is appropriate for a regional development program of the scale of the GOV scheme is not valid; the expenditures on this program have been a fair proportion of governmental revenue from taxes. (1) The scheme also drew large numbers of scarce managerial and technical personnel away from government departments and private firms due to the lure of high salaries and allowances, which undoubtedly had repercussions on the salary and other emoluments structures that prevailed. Secondly, a rapid reduction of external foreign reserves was partly the result of payments to foreign contractors and the large-scale import of capital equipment in the form of earth moving machinery, tractors and trailers "expensive Barber-Green road making machines" (4 ; p 36), motor vehicles and building materials, which hastened the tightening of import control and exchange regulations. Thirdly, the impact of the scheme on the fairly developed eastern coastal belt towns, approximately 40 miles away from the Valley, is believed to have been

(1) See 4 ; p 155 and 43 ; p 248, summarized below:-

Financial Year	Annual Expendre On GOV Program	Govt. Revenue from taxes	Expendre. As A % of Rev.
1961/62	Rs 39.42 mln	Rs 313.98 mln	12.4
1962/63	39.50	319.29	12.5
1963/64	43.92	323.81	13.3
1964/65	45.84	335.84	13.7
1965/66	63.38	349.47	18.0

substantial as large numbers of Board employees, settler families, squatters and traders moved into the Valley and began to depend on provisions and supplies from these market centers. This is especially true since the rail terminal for the east-coast railway line is at Batticoloa (on the east coast) and all supplies are channelled through this major town to Amparai, the headquarter town in the Valley. Fourthly, the GOV development program resulted in the construction of trunk roads connecting the region to the capital city on the west coast, to the hill country and the eastern region such that the east coastal holiday resorts became popular with vacationers from the big cities; part of the crowds that vacationed traditionally in the hill country holiday resorts moved to the Valley and the east coast during the holiday seasons. ⁽¹⁾ This was facilitated by the establishment of the Uhana (in the Valley) and the Batticoloa (on the east coast) airports and the scheduling of a daily plane flight from Colombo (the capital city on the west coast). These developments were a direct result of the scheme. The Valley has become a popular holiday resort especially because all public officers (including subordinate and minor grades, and all teaching staff under a centralized government education system) can utilize their annual holiday (railway) warrants to travel by air.

Prest and Turvey hold that :-

"It is always important, and perhaps especially so in economics, to avoid being swept off one's feet by the fashions of the moment. In the case of cost-benefit analysis, one must recognize that it is a method which can be used inappropriately as well as appropriately. There are two very clear general limitations of

(1) The GOPEC did not take account of the benefits accruing to the program as a result of recreation development.

principle (as distinct from the many more of practice) which must be recognized at the outset. First, cost-benefit analysis as generally understood is only a technique for taking decisions within a framework which has to be decided upon in advance and which involves a wide range of considerations, many of them of a political or social character. Secondly, cost-benefit techniques as so far developed are least relevant and serviceable for what one might call large-size investment decisions. If investment decisions are so large relatively to a given economy (e.g., a major dam project in a small country), that they are likely to alter the constellation of relative outputs and prices over the whole economy, the standard technique is likely to fail us, for nothing less than some sort of general equilibrium approach would suffice in such cases. This means that the applicability of the technique to underdeveloped countries is likely to be less than is sometimes envisaged, as so many investment projects involve large structural changes in such areas." (11 ; p 684).

These limitations apply in large measure to the GOV (1) project evaluation: Not only is Ceylon an extremely small country, but the investment in question was a very large one, too. The GOV scheme was so large as to have had important repercussions in the rest of the economy and, therefore, the (un)"profitability of the project cannot be regarded as a good measure of net social benefit" (16 ; p 34).

This evaluation was indeed the first attempt to apply social benefit-cost analysis in project evaluation in Ceylon and evoked a great deal of enthusiasm and interest. It is seen, however, that the technique was inappropriate. Not only was it inappropriate in a strictly theoretical sense, it was inapplicable in the context of a severe dearth of basic information: No farm management studies were available in any of the several colonisation projects.

(1) A physical area of 25,000 square miles, a population of 13 mln. as at June 30th, 1969, and a GNP of approximately \$ 1,122 mln. during 1966 (13).

(7) The Policy Conclusions Of The GOPEC With Reference To Peasant Colonisation And Settlement Are Invalid

The major conclusion of the GOPEC with regard to colonisation and settlement is that they have been a failure and that governments should desist from channelling resources towards settling peasant farmers. They have implied that peasant colonisation is intrinsically uneconomic and unlikely to ever prove profitable, or serve as a basis for the development of domestic agriculture (4 ; p 42 of Chap 6, in conjunction with p 140 of Chap 12). These conclusions imply that reasonable efforts were made at developing the agriculture within the settlements in the GOV. There has been little awareness, however, of the fact that if these projects were to have yielded a return greater than the costs incurred, the land development and settlement programs should have gone hand in hand with a program for 'modernizing' ⁽¹⁾ the 'traditional' agriculture to which the settlers had been used to and which currently prevails in these colonisation schemes.

Attempts to raise output to the optimum level within a framework of traditional agriculture cannot lead to a continuing

(1) The term 'modernization' is used in the context that inputs used in agricultural production in the settlements are based on the findings of modern science and continuing technological development. It refers to a situation where seed varieties used have been scientifically tested for their superior biological features, where water supplies are finely controlled and co-ordinated with cultivation; where crop rotation, soil fertility and conservation practices are extensively practised; where institutional arrangements are created for the efficient channelling of inputs and where the production system is supported by a good marketing, processing and distribution system. It does NOT imply here what Marsden refers to as a 'Crash Modernization' strategy (17); viz., the mechanization of operations or the direct borrowing of techniques and institutions of countries with a highly developed agriculture; on the contrary, it specifically excludes such tendencies in the definition of the concept for a less developed, capital poor country such as Ceylon.

process of growth and development (18); nor can it be ever expected to cover the heavy capital costs incurred. If the conditions necessary for modernizing peasant agriculture had not been established one could have stated at the very outset that the social benefit-cost ratio for a capital intensive river dam project and a traditional agriculture would most certainly be less than unity without an elaborate computation that the GOPEC took two years to calculate.

An organized effort at planned agricultural modernization and agricultural development was, indeed, necessary within the GOV colonisation settlements if the investments on the projects were to become profitable. However, such an effort was not made by the Board authority (5 ; Chaps. III to IV) despite the awareness that those re-settled within these settlements were basically traditional (paddy) cultivators. If so, the poor performance of the settlement projects lie not in the choice of the investment, but in the way that these projects were executed, managed and administered. This leads to the conclusion that even if resources already devoted to peasant settlement were channelled in any other direction, they would not have yielded any better results since the bottleneck of the lack of qualified and able personnel with organizational and managerial abilities continues to prevail.

The GOPEC have failed to identify the appropriate social costs and benefits relevant to the colonisation and settlement projects; a variety of costs not ascribable to colonisation and settlement have been included; broad aggregates of expenditures have been apportioned to this segment without ascertaining whether such costs really belonged to the category under

investigation; the benefits from colonisation have been underestimated; a limit of fifty years has been capriciously placed on the period of evaluation and the rate of discount has not been adequately justified. Since the benefit-cost assessment of colonisation and settlement has been incorrectly handled, the benefit-cost ratio identified for this segment of the program is unacceptable. Furthermore, a single benefit-cost ratio for a variety of sub-projects, with different individual characteristics and at different stages of development, have little meaning even if the accurate identification of costs and benefits were possible. These limitations in the GOPEC's benefit-cost analysis would seem to invalidate the conclusions arrived at by the GOPEC.

Even if the benefit-cost assessment can be assumed to have been accurately performed, a benefit-cost ratio of less than unity does not necessarily lead to the conclusion that the investment of these funds on any other projects would have yielded a higher net return; it may be that these projects were uneconomic purely because no attempts were made by the Project Authority at modernizing the agriculture within the settlements.

III - IN SEARCH OF A CONCEPTUAL FRAMEWORK FOR THE
EVALUATION OF ON-GOING PEASANT SETTLEMENT
PROJECTS IN CEYLON

The traditional approach of economists to the evaluation of economic projects has been in terms of the concept of economic growth; viz., the extent to which a given project has resulted, or is likely to result, in increasing the GNP of the country. And, the benefit-cost technique has provided a handy measure for assessing the potential of a given project to add to GNP.

A benefit-cost analysis, however, has limited significance; It is valid only for a small segment of total economic activity and for the assessment of the economic profitability of a project at a given point in time. It pre-supposes that relevant data, especially of potential benefits that may accrue over time, are ascertainable with a fair degree of accuracy. Benefit-cost analysis is conducted under the restrictive assumptions of the perfect competition model, viz., a given technology, a fixed and invariable institutional framework, perfect knowledge, etc., and would, therefore, be inappropriate where structural changes are envisioned and technological developments are likely to revolutionize production conditions. In any event, a benefit-cost ratio is insufficient basis for national policy formulation; it tends to obscure the important issues which lie behind the ratio, and there is the danger that "once an elaborate and somewhat arbitrary measurement emerges, as from benefit-cost analysis, a strong faith is placed in it. The unstated assumptions remain unstated and are frequently ignored" (19).

Confining the evaluation of on-going peasant settlement projects to this single approach of economic efficiency alone is, therefore, undesirable in a less developed, dual economy, such as Ceylon where structural changes are necessary for growth and development. It is proposed in this paper that an evaluation should cover at least the following broad dimensions if it is to serve useful for national policy formulation -:

- (1) The assessment of a given peasant settlement project in terms of its relevance in the overall strategy of planning for economic development.
- (2) The potential of the project in furthering the objective of economic growth.
- (3) The extent to which the broad developmental goals of alleviating poverty, reducing unemployment and the reduction of inequality have been, or are likely to be achieved as a consequence of the project.

(1) Peasant Settlement In The Overall Strategy Of Planning For Economic Development

Since the forties the government of Ceylon has been following a strategy of peasant colonisation settlements as a basis for the utilization of the dry zone for agriculture. By 1966, approximately 287,000 acres in the dry zone had already been brought under irrigation-colonisation schemes (20), and a further extent is to be settled with peasant farmer families under the Mahaveli River Basin Development program presently under way. In terms of the Land Development Ordinance of 1935, each settler family is

provided three to five acres of irrigable land and one to four acres of high land for cultivation purposes, within the framework of organized settlements. Thus, the strategy of dry zone land settlement and domestic (as opposed to plantation) agricultural development has largely been through the system of small family farms.

That small sized farm units have the potential for reaching a high level of agricultural productivity and become capable of meeting the growing demands for food, as industrialization and urbanization gets under way, has already been demonstrated. (1) The abundance of labour in Ceylon, relative to capital, further encourages the view that this is, in fact, an appropriate strategy for the exploitation of the available dry zone land resources.

However, peasant colonisation settlements were mainly predicated by considerations of political stability. With the conversion of jungle land into tea and rubber plantations since the 1850s the peasantry were gradually deprived of their traditional sources of dry land cultivation, firewood and pastures, and compelled to subsist purely on their meagre paddy fields.

"The grafting of plantation agriculture on the older peasant system inflicted concomitant hardships on the use of land by the peasantry. Land set apart for grazing cattle and for use as chenas in the communal village reserves was lost under the Waste Lands Ordinance of 1840. Thenceforward there was no provision for normal expansion of village cultivation". (22 ; p 28).

With population growth and ^{the} resultant fragmentation of these paddy fields a severe land hunger had developed among the peasantry. The

(1) The Japanese (21) and Taiwanese experiences for example.

establishment of peasant colonisation schemes served to satisfy this urgent need; they widened the base for 'farm financed ^{social} welfare' (23), and have enabled the containment of the peasantry in the face of rapid population growth.

In addition to expanding employment opportunities and the temporary alleviation of the problems arising out of rapid population growth, new land colonisation projects widened the resource base for domestic agriculture, increased the territorial influence of government and circumvented the problems of restrictive tenurial arrangements and absentee landlordism that obtain in the traditional villages. "The highly favourable characteristics of these schemes are that practically all the farms are of a viable size, and that the tenure conditions are nearly ideal. The settlers are in effect owner cultivators restricted only in selling, mortgaging and leasing of their land." (20 ; p 6). Such settlement schemes have also been more amenable to planned agricultural modernization; as peasant farm families were brought within these structured colonisation settlements, the environment conducive to such modernization has been created due to the possibility of better control and organization of cultivation programs as well as the increased incentive of individual ownership. Colonisation settlements have already lent themselves to the intensification of campaigns for the extended use of chemical fertilizers and new seeds (24) as well as for the establishment of development banks (2 ; p 18) based on the Raifessan pattern, much more easily than the traditional villages.

Accordingly, colonisation agriculture appears to be the key source of improved agricultural productivity in the domestic sector. Jegaratnam and Schickele hold that "...farmers in the colonisation schemes have a natural advantage in modernizing their production processes and leading the way to higher productivity and levels of living in the rural sector" (25 ; p 53).

That the development of domestic agriculture is a 'sine qua non' for the industrialization of a basically agrarian economy may be accepted as a point well established (26 ; Pt I and 27 ; Pt. VII). The colonisation schemes are likely to be the quickest source of increasing the food supply and the consequent reduction of the import content of food needs in Ceylon, 46% during 1968 (2 ; p 267). They provide opportunity for agricultural diversification in terms of poultry and livestock production, vegetable and subsidiary crop cultivation etc., and, therefore, the possibility of insulating the economy from the instability created by a high dependence on tea exports for the purchase of domestic food needs. (1) One might even argue that peasant colonisation projects have served as a basis for evening out the dualistic nature of the Ceylon economy because the creation of such settlements have facilitated agro-based industrialization and the growth of inter-connections between the modern and traditional sectors. If the productivity of settlement agriculture is raised to a high level, it is possible that the savings required for investment in industry would originate

(1) Tea exports during 1967 constituted 63% of total foreign exchange earnings while 49% of total food requirements were imported for domestic consumption (2;pp 251 and 267).

from this source. In any case, the successful import substitution of consumers' goods industries will depend largely on the improvement of colonisation agriculture.

The structural changes that have been set in motion by these projects are as important in a less developed, dual economy where over 50% of the labour force is dependent on domestic agriculture, as are considerations of short-run economic efficiency. It would, therefore, seem incorrect to write-off peasant colonisation as suggested by the GOPEC merely on the basis of an adverse benefit-cost ratio in respect of the GOV peasant colonisation settlements. It is imperative that evaluators should identify the role of a given colonisation project in the overall strategy of planning for economic development before definitive conclusions are placed before policy makers.

(2) Potential For Economic Growth

Growth in domestic agriculture is likely to result mainly from consciously planned agricultural modernization of the colonisation settlements (23 ; p 53), a function which essentially rests with the Project Authority, usually an arm of the government (1). Recent technological developments relating to chemical fertilizers and new seed materials achieved outside Ceylon, have paved the way

(1) Myrdal argues that modernization, growth and development of the less developed economies will not come about by natural evolution, but by direct participation and intervention by the State. (28 ; Chap 14).

for a rapid rise in agricultural productivity. It has to be remembered, however, that economic growth is primarily a function of technological development on the domestic front, too, and that without continuous local experimentation and improvement of agricultural technology, sustained growth cannot be maintained. Because new technology for agriculture is being developed outside, it does not mean that domestic research and development could be marginal. On the contrary, both (1) basic research directed towards improving local varieties of seed and the utilization of domestic raw materials for fertilizer production, etc., and (2) adaptive research which attempts to test and adapt new knowledge from outside and from internal research effort to local conditions should be primary considerations in fostering the growth process. There is a lesson to be learned from the results of the field fertilizer trials of the FAO program conducted by Constable and Wijewickreka - that the indigenous varieties of M₄ and H₈ seed paddy are much more suitable for extensive local use than are the new IRRI varieties until substantial experimentation and adaptation of the latter have been completed. If the import content of chemical fertilizer production is to be minimized, much effort has to go in to the identification and exploitation of indigenous raw materials.

Adaptive research in new technology is also fundamental if traditional farmers are to be won over towards making the transition to a modernized agriculture; Deep-seated fears and uncertainties have to be overcome, and this is possible only if change agencies themselves/^{become} competent in gearing new technology to

specific local needs and conditions.

The success of a modernization program depends not only on appropriate basic and adaptive research in the development and diffusion of new technology, but also on the efficiency of the agricultural extension service and the effectiveness of the link between research, extension and diffusion programs. As far as agricultural extension is concerned, Professor Schickele has drawn attention to the need for demonstration plots on farmers' fields in Ceylon (29) rather than the aesthetically elegant model farms where little consideration is given to the notion of maximizing returns over costs. And, Rogers (30) emphasizes the capacity of change agents to recognize the gap between source and receiver and the need for greater empathy and understanding of a receiving social system if innovation diffusion is to be successful. What these viewpoints suggest to the evaluator is that the mere existence of research facilities and extension services is insufficient to indicate the conditions for growth in agricultural productivity and that it is necessary to delve deeper and ascertain how relevant such institutions are to the particular context, and the efficiency with which they are being operated.

An important aspect in the evaluation of a peasant settlement project would thus be the ascertainment of the extent to which agricultural modernization has been attempted by the Project Authority and the bottlenecks that hinder progress. Only then can one be in a position to identify the future potential for growth within a given scheme.

Secondly, while one side of the growth coin is agricultural modernization which tends to raise productivity, the other side is that of population growth which tends to reduce output per capita. Unless evaluators identify the role of population growth in depressing per capita output and the standard of living, policy makers cannot be sufficiently forewarned of the need to formulate policies for population control. As much as colonisation settlements lend themselves to the easier introduction of new technology and to the creation of new attitudes and values, 'ipso facto' they provide a situation for the effective diffusion of family planning measures. One aspect of an evaluation then is to identify the population base, its age structure, current and anticipated fertility and death rates, and the preparation of population projections so that comparison between population growth trends and likely trends in the growth of output are made possible.

Success in modernization is also dependent on motivational factors (31) and the quality of the human agent (32). The relationship between price and cost for each of the crops grown within a project, and farmers' responses to subsidies and guaranteed prices (33), need to be clearly understood. Also, the existing structure of formal education and programs for imparting technical and specialized skills related to improving the quality of the agricultural labour force must be assessed for growth in agricultural productivity to be evaluated.

Thirdly, overall economic growth and development is highly dependent on the capacity to increase foreign exchange earnings (34) (or savings). Foreign exchange is of fundamental

importance to an import-export oriented economy such as Ceylon, especially on account of the present balance of payments crisis. A careful assessment of the capacity of a project for import substitution and the potential for earning (or saving) foreign exchange should form an integral part of any evaluation. The concept of net foreign exchange earnings (or savings) needs to be emphasized herein. A reduction of food imports due to an increase in the marketed surplus arising out of the creation of the project may cause savings in foreign exchange. However, if the import component of capital and associated costs (tractors, hullers, vehicles, implements, chemicals, etc.) rise as a consequence, the net contribution to foreign exchange may be adverse.

Fourthly, the absence of an effective marketing system for a given project, including the system of purchases under the guaranteed price schemes and the subsidized sale of key inputs including production costs, can be a major constraint and needs to be evaluated from the standpoint of its capacity to foster economic growth. The marketing system may even perform the function of a leading sector (35) for a project and lead to the growth of linkages between the modern and domestic sectors, facilitating thereby an evening out of the extreme dualism of the economy. An evaluation of the performance of the marketing system for a given project and the identification of bottlenecks to further improvement is a necessary condition for the formulation of appropriate policies.

Finally, the calculation of a benefit-cost ratio would fit in within this segment of the evaluation. The problems that should be avoided in a benefit-cost analysis of a peasant

settlement project are implicit in the discussions in Section II. It may be emphasized, however, that where such an analysis is resorted to there is the need to (1) disaggregate the variety of projects, to define each sub-project carefully and to calculate separate benefit-cost ratios for each sub-part of a program, and (2) to carry out sensitivity analysis rather than account for uncertainty through rigid and restrictive assumptions of a once for all nature.

While benefit-cost analysis is a useful tool for assessing the growth potential of a given project, its relevance depends on the circumstance of each case: Whether a benefit-cost ratio should be computed is a matter of judgement. For example, where the capital cost of a project is extremely high, relative to operating and maintenance costs, but the benefits reaped depend upon a primitive agriculture, a benefit-cost analysis is but an expensive theoretical exercise. Even if agricultural modernization were under way, assumptions regarding the likely streams of benefits and costs are not likely to be possible with any degree of certainty since the success of modernization programs within traditional peasant societies would not only be a matter of developing new rural institutions, new attitudes and new forms of behaviour, but also on the progress achieved in the manufacturing and distributive sectors. Knowledge about likely developments on these fronts is highly limited and may be of a complex nature. That the validity of benefit-cost analysis is circumscribed by these factors needs to be borne in mind.

(1)
 (3) The Yardstick of 'Development'

Ceylonese social policy since the late fifties has been directed towards the minimization of the rigours of poverty and the elimination of inequality. The goal of reducing unemployment has also been an oft repeated one, but economists have not been able to assist the policy maker with practical solutions to the problem. This shortcoming has partly been the result of the strong faith hitherto placed on 'industrialization' as the panacea for all economic ills and the concomitant neglect of the agricultural sector as a potential source of growth and development.

An increasing awareness of social scientists of the importance of separating the concept of 'development' from the notion of economic 'growth' (36) has characterized the present era largely as a consequence of the growing interest in the problems of the less developed countries. The argument has been as follows: The purpose of achieving economic growth is ultimately the maximization of overall human welfare rather than the maximization of GNP per se. But, attempts at eliminating inequality of opportunity and inequities in the distribution of income so as to enable the

(1) The term 'development' is referred to herein "in the broad sense of expanding opportunities and the human capacities needed to exploit them along with a general reduction of poverty, unemployment and inequality" (19 ; p 8), in contradistinction to the 'growth' concept which is restricted to that of increases in real per capita income, whichever way it was achieved and irrespective of whether a highly skewed distribution of income resulted in the process.

"realization of the potential for human personality" (36) have seldom gone hand in hand with economic growth; in some instances economic growth has actually led to a worsening of the situation. Therefore, greater emphasis should be directed towards viewing the growth process in the 'development' context.

Following the same vein of thought, this subsection of the paper attempts to show that the evaluation of on-going peasant settlement projects should not only be confined to the notion of economic growth alone, but should be broadened to cover the indicators of development, i.e., an evaluation of a peasant settlement project should focus attention on the extent to which the developmental goals of a minimum level of per capita income, productive employment for the labour force and the equality of opportunity have been achieved in respect of those ^{vis a vis the} so settled ^{urban sector} due to the implementation of the project.

This is essentially a bottom-up approach; an evaluation arising from a clear understanding of the peasant settler system in its physical, economic and social dimensions, while the 'growth' approach is viewed as a top-down process of assessing a project from the viewpoint of its potential contribution to the GNP.

One measure on the development side (37 ; Chap 4) is the extent to which the social system within a settlement project has been raised near or above a 'poverty line' which needs to be nationally defined. ⁽¹⁾ On the supply side, poverty reduces the

(1) The 'Committee on the Unit of Land Alienation' in Ceylon, 1968, defined the minimum desirable income for a settler family as Rs 4,500 p.a., and the size of land allotment was based on this criterion of potential income earning capacity as well.

capacity of peasant settlers to use modern inputs in the production process, to bargain for favourable conditions in the exchange process and for the acceptance of innovative ideas on account of their lack of capacity to tide over crop failures that may result from innovation. It leads to hunger and malnourishment and reduces mental and physical capacity to increase work effort. (1) On the demand side, slow growth

in effective demand thwarts the national effort at industrialization and successful import substitution of manufactured consumers' goods,

The assessment of a peasant colonisation project in terms of the 'poverty rate' and the 'poverty income gap' would provide useful guidelines to the policy maker. For example, a wide discrepancy between accepted minimum levels of per capita income and the actual levels obtaining may encourage concerted efforts at agricultural modernization programs. Evaluators need to provide positive guidelines about what seems to be called for under the circumstances, whether it be the establishment of regional training programs for the provision of special skills and knowledge relevant to agriculture's development, the provision of electrical energy for local industrial activity, etc. Attendant upon all this interest is also the inducement of empirical research and study into questions related to poverty and its debilitating effects on productivity growth.

The extent of rural un and under-employment is not ascertained by the Department of Census and Statistics though detailed figures of open urban unemployment are. This is largely because of

(1) "The seriousness and magnitude of the problems of under-nutrition and malnutrition in the less developed countries demand immediate long term planning at national and international levels" (38 ; p 10).

of the difficulty of measurement. However, without a clear understanding of the patterns of rural un and under-employment, macro planning for the agricultural sector can serve very little purpose; the initiation of rural processing and other industries and rural development projects, or even cottage industries, so as to provide off-farm employment opportunities for rural people, cannot be successful unless the cyclical patterns of agricultural employment are correctly identified.

The slow rate of industrialization of the Ceylon economy makes it all the more important that employment opportunities should be found within the agricultural sector for the rapidly growing population (39). As per capita real income within the agricultural sector tends to decline with the pressure of population growth, given slow growth in agricultural productivity, the propensity to migrate into the urban sector is increased. Such migration from the rural to the urban sector can create unprecedented pressures on increasing social welfare facilities and employment opportunities in the latter leading thereby to a vicious circle where migration is induced with each attempt at curing the problems of urban unemployment (40).

Unemployment not only reduces human dignity (36), but also creates pressures on governments to take 'ad hoc' measures on relieving misery, all of which further reduces the capacity to execute well conceived overall plans for economic growth. If policy makers are to be provided with insights into the ramifications of rural un and under-employment, evaluators have the responsibility of measuring their extent, of indicating their implications, and

the suggestion of appropriate guidelines for action.

Inequality of opportunity is largely a matter of income distribution. A highly skewed distribution of income retards economic growth and progress by keeping the level of effective demand anchored to a low level. But, income redistribution need not be direct; it can be achieved in such a way that labour productivity can be substantially raised for the benefit of society as a whole. Within the framework of a dry zone colonization project, much can be done in the way of education and training to reduce the inequality that settlers have relative to their urban and industrial sector counterparts. Though education is free in Ceylon, inequality between sectors exists in the way facilities by way of qualified teachers, buildings, laboratories, etc., are channelled. Access to skills outside the formal education system is unavailable in these regions. Inequality exists in the way credit and guaranteed price schemes are operated and the availability of all weather roads, water supply schemes and medical facilities, etc. But, the most retarding inequality existent within peasant settlement projects is the general absence of responsibility of project authorities to their clientele, and the low degree of participation of settler farmers in the decision making processes, let it be in regard to water issues, the planning of the cultivation season, or even the supply of inputs or the disposal of their outputs. In the GOV project, for example, the settler plays a highly subservient role 'vis a vis' project officials. The function of an evaluation is to point out the extent to which they inhibit growth in productivity, and to recommend remedial measures.

Finally, a proper evaluation of 'development' requires a careful assessment of (1) the 'de facto' beneficiaries of a given project as at the time of evaluation and (2) the potential future beneficiaries as the project gathers momentum. The former would indicate whether the anticipated benefits really accrued to the intended beneficiaries, or not, and the latter would enable a forecast of the likely distribution of benefits between farm groups, as for example between landowners under the settlement scheme and landless labourers, and the political and social consequences that may follow as modernization and growth occurs. The distributional consequences arising from the implementation of a settlement project is an important component of an evaluation if it is to prove useful in aiding national policy formulation.

III - SUMMARY AND CONCLUSIONS

The benefit-cost technique is a yardstick which facilitates the decision making process related to the selection of economic projects for implementation, especially insofar as selection among projects is concerned; It enables the identification of those projects which would best serve the achievement of short-run economic efficiency; economic efficiency being defined as the maximization of output for a given budget. It enables the economist to offer the decision maker a variety of alternatives to choose from in keeping with the broader goals and objectives of society.

Also, since there is no automatic mechanism that would signal when, or how, a given public project has become unproductive, or otherwise, benefit-cost analysis may be considered an appropriate technique for evaluating whether or not it is yielding a social benefit in excess of social costs. Such evaluation enables the examination of the implications of diverting further public resources on the project.

Benefit-cost analysis as it has traditionally developed, however, has been a technique for looking ahead before the inception of a project: It attempts to forecast the course of future events of a given project, and quantify the potential benefits and costs that are likely to accrue over the postulated life of the project, if it were implemented, given the resource and other constraints surrounding its establishment.

In this sense, the approach of the GOPEC has been unique; they adopted this technique to evaluate the performance of the GOV development program during a past period of sixteen years and predict what is in store for the future in terms of the various components of the program. In the usual case where the benefit-cost technique is applied, the forecasts of future benefits as well as costs are made with less information and precision, based on a wider range of assumptions of how the future will unfold. In the present case, however, data on the actual course of events were available to the analysts in respect of a considerable period in the past. It may, therefore, be contended that the GOPEC were in a better position at identifying future trends, both in the economy as well as within the scheme, more accurately unlike in the usual case referred to.

Yet, this benefit-cost assessment of the GOV development program has been deficient in a number of ways. Assumptions regarding the rate of discount, the time horizon for the analysis, and the cost components included within it, have been stated with a sense of finality, but on closer examination appear to be hardly justified. For example, the rate of discount has been fixed at 10% on the basis that this is the rate at which funds are available to the "unorganized sector of the capital market" (4 ; p 19), and it has been implicitly assumed that this is the rate which reflects the social opportunity cost of capital in Ceylon. No consideration has been given to the fact that the major capital expenditures had already been incurred when the opportunity cost of capital for government program was

not nearly as high as it existed at the time of the evaluation; investment funds were not scarce to the Government of Ceylon at the early stages of the scheme as this paper has attempted to show.

Relatively short time horizons, higher discount rates and safety margins in the estimation of benefits and costs are all defenses in the benefit-cost technique to guard against risk and uncertainty about projections into the future. And, even if all these defensive strategies were adopted in the evaluation, such assumptions should not be treated as fixed and invariable as the GOPEC have done. Sensitivity analysis is an important component of benefit-cost analysis, and a better method for handling uncertainty than the adoption of restrictive assumptions of a once for all nature. It is re-emphasized that the GOPEC had the advantage of approximately sixteen years (nineteen, if we reckon the time when the report was finalized) of hindsight and had actually to project into a relatively shorter future. There was less reason, therefore, to limit the period of analysis to fifty years, despite the fact that the GOPEC anticipated the irrigation scheme to last long beyond 1998 (4 ; p 18).

In addition, the costs appurtenant to colonisation and settlement have been overstated, and the benefits underestimated. Also, the 'with-without' principle has been flouted in an attempt to dramatize the difference in results between the Board sponsored and controlled colonisation settlements and the privately owned Purana lands.

The GOV development program was basically an agricultural development scheme. Therefore, the beginning point

of the GOPEC's benefit-cost analysis of the colonisation projects should have been the farm budgets and the net incomes of farm families within the various colonisation settlements in the Valley. Changes in the net incomes of each of these groups of farmers would have been the most appropriate indication of performance and the key to identifying the shortcomings. The best single measure of the effectiveness of an agricultural project is "the increase in net incomes of farmers brought about by enhanced productivity" (41;p 1). But, the GOPEC's efforts at identifying the net returns per farm have been very limited and unscientific.

Peasant colonisation projects in Ceylon have, in fact, enabled the utilization of unemployed land and labour resources, and have afforded the opportunity to overcome many of the obstacles that exist in raising agricultural productivity in the traditional villages. In view of the dim future prospects for the major agricultural exports of tea, rubber and coconut, the domestic sector is likely to be the biggest contributor to economic growth and development in the early years ahead (29 ; p X). And, within the domestic sector, the peasant colonisation schemes have been shown to provide the greatest potential for agricultural modernization and expansion (23 ; p 53). But, the GOPEC have ignored the positive side of peasant colonisation.

These shortcomings seem to indicate that benefit-cost analysis has been used more as a tool for substantiating a pre-conceived notion that the colonisation projects are intrinsically uneconomic and that governments should be dissuaded from

investing on such projects. The inflexibility with which the assumptions have been stated and improper comparison of the colonisation projects with the purana lands project (4 ; Chap 6), provide evidence of such a bias. And, based on the results of the benefit-cost analysis alone, the GOPEC have arrived at the conclusion that peasant colonisation has been, and is likely to continue to be, a drain on the national economy and must be rejected as a potential source of economic growth. This paper has argued that such a conclusion does not necessarily follow even if the benefit-cost analysis was correctly executed, and that the evaluative framework should be widened before justifiable conclusions can be arrived at.

It must be pointed out that criticism of the activities of the Board has been mounting steadily during the last decade. This ministerial Committee (the GOPEC) was, in fact, established in response to the severe criticisms of the Board both within Parliament and other circles. Perhaps, the GOPEC's determination was to lay the final nail in the Gal Oya Development Board's coffin. Whatever the circumstances may be, strong objection should be raised about the GOPEC's misuse of benefit-cost analysis for this purpose, as would seem to appear from the above discussion, mainly because in directing its attack against the extravagance of the Board, the GOPEC have incorrectly discredited the national policy of peasant colonisation and settlement, ignored its potential for the growth and development of domestic agriculture and have misguided policy makers thereby.

Benefit-cost analysis by itself is insufficient for the evaluation of on-going peasant colonisation projects in Ceylon. An evaluation which would provide useful guidelines for national policy formulation in a less developed, dual economy, such as Ceylon should cover at least three broad aspects. Firstly, it is necessary to identify the relevance of a given colonisation project in the overall strategy of planning for economic growth and development. Peasant colonisation in Ceylon is one aspect of the program of agricultural diversification away from tea and rubber. Some projects may be best suited for increasing the supply of rice produced while other may be suited for subsidiary or fruit crop cultivation; yet others may be best suited for poultry and livestock breeding. They are, therefore, intimately connected with the import substitution program directed towards saving foreign exchange for the purchase of more industrial and intermediate goods. Agricultural diversification is, in turn, tied up with the program of industrialization, which depends very closely on agricultural development and success in raising the level of per capita incomes of the farm people.

Especially since development planning in Ceylon has not been based on a proper integration of agricultural development and industrialization, an evaluation needs to identify in clear terms how a given colonisation project fits into the overall strategy of planning for economic growth and development.

Secondly, it is necessary to evaluate the potential of a given project to contribute to economic growth in terms of the capacity to modernize its agriculture, the potential for

increasing foreign exchange earnings, the possibility of initiating family planning programs and of establishing an improved marketing system, etc. Benefit-cost analysis may be a relevant tool within this part of the evaluation depending on the circumstances of the case. It has to be recognized that the mere provision of land and water to traditional farmers under the new and trying conditions of the dry zone, and the availability of research and extension services, is insufficient for the growth of a profitable agriculture, and that it is necessary to evaluate the many motivational, institutional and organizational factors that retard or facilitate the process of growth.

Finally, a project needs to be evaluated in terms of its contribution, current and potential, for achieving the broad goals of development, viz., the reduction of poverty, increased employment opportunities and of reducing inequality insofar as they contribute towards raising the overall productive capacity of the people within the project and of the region within which it is situated.

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GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE
AND RURAL DEVELOPMENT

PART III

FUNCTIONS AND POWERS OF THE BOARD

6. (1) The Board may, subject to its other provisions of this Act, discharge all or any of its functions and exercise all or any of its powers within the area (herein after referred to as the "area of authority") consisting of -

- (a) the area declared by Order of the Minister to be the Gul Gya Valley for the purposes of this Act, and
- (b) such other areas as may be declared by like Order to be within the control of the Board.

(2) No Order made by the Minister under sub-section (1) shall have effect until it has been approved by the Senate and the House of Representatives and published in the Gazette.

(3) Nothing in sub-section (1) shall be deemed to preclude the Board from maintaining any office or stores outside the area of authority.

(4) The Minister may by Order published in the Gazette direct that the Board shall cease to discharge or exercise all or any of its functions or powers within the whole or any part of the area of authority; and every such Order shall be complied with by the Board.

Developed area and

7. (1) The Minister shall divide the area of authority into -

- (a) the developed area, and
- (b) the undeveloped area.

The limits of each such area shall be specified by Notification published in the Gazette.

(2) If any local authority within the area of authority is likely to be affected by the division of that area into the developed area and the undeveloped area, the Minister shall, in making such division, consult the Minister in charge of the subject of Local Government.

Functions of the Board.

8. The functions of the Board shall be -

- (a) to develop the undeveloped areas;
- (b) to promote and operate schemes of -
 - (i) irrigation,
 - (ii) water supply,
 - (iii) drainage,
 - (iv) power, and transmission and supply of electrical energy, and
 - (v) local control;

- (e) to regulate and control irrigation and fisheries;
- (f) to promote afforestation;
- (g) to control soil erosion;
- (h) to promote public health;
- (i) to prevent and control plant and animal diseases; and
- (j) generally to promote agriculture and industrial development and economic and cultural progress in the area of authority.

9. (1) The Board may construct or maintain roads and construct, maintain and operate dams, channels and other irrigation works. Roads and irrigation.

(2) The Board may determine and levy rates for the supply of water for irrigation.

10. (1) The Board may construct waterworks for the supply of water for industrial or domestic purposes and may supply water to any Government department, local authority, or any other person or body of persons. Water supply.

(2) The Board may determine and levy rates or fees for the supply of water whether in bulk or by retail, and such rates or fees may be levied from any consumer of water supplied by the Board whether such consumer is a Government department or a local authority or any other person or body of persons.

11. All irrigation works which, at the date on which the Board is established, are maintained and operated within the area of authority by the Government shall, on and after that date, be maintained and operated by the Board. Existing irrigation works.

12. Save as otherwise prescribed, no person shall, on or after the date on which the Board is established, construct in the undeveloped area any irrigation works or waterworks without the prior sanction of the Board or otherwise than in accordance with such conditions as may be imposed by by-laws or directions made or issued by the Board. Works requiring sanction of the Board.

Generation and supply of electrical energy. 13. (1) Notwithstanding anything in the law, the Board may within the area of authority -

(a) establish, maintain and operate such installations as may be necessary for the purpose of generating, transmitting and supplying electrical energy, and

(b) sell such energy to any consumer or supplier, whether such consumer or supplier is a Government department, local authority, or any other persons or body of persons.

(2) For the purpose of establishing, maintaining and operating any installation for the generation, transmission and supply of electrical energy, the Board shall have all the powers conferred on a Chief Executive Officer of a public utility corporation by the Electricity Act, 1948, and the provisions of that Act shall apply to the Board as if it were such a corporation, and the Board shall be deemed to be a public utility corporation for the purposes of that Act and to be a public utility corporation for the purposes of the provisions of that Act which relate to the supply of electricity.

(4) The electricity law shall apply within the undeveloped area subject to the following modifications :-

- (a) the Board shall be the authority who is empowered to issue licences and permits under the electricity law and who is generally responsible for the administration of that law, and accordingly every reference in that law to the Chief Engineer or Manager of the Department of Government Electrical Undertakings shall be deemed to be a reference to the Board;
- (b) the Board shall determine the fees to be charged for the supply of electrical energy whether in bulk or by retail, and such fees shall be recovered in accordance with the electricity law and credited to the fund of the Board;
- (c) the Board may, in any contract for the supply of electrical energy in bulk by the Board to any other supplier, impose such terms and conditions, including the rates of fees to be charged by the other supplier for the sale of electrical energy by retail to consumers, as it may deem necessary or desirable for the purpose of encouraging the use of electrical energy.

14. (1) The Board may establish, maintain and operate laboratories, experimental and research stations and farms for conducting experiments and research in respect of any of the following subjects :-

Other activities of the Board.

- (a) the utilization of the water, electrical energy and other resources in the most economical manner for the development of the area of authority;
- (b) the determination of the effect of the operations of the Board on the flow of rivers in the area of authority;
- (c) any other subject included in the functions specified in section 8.

(2) The Board may establish its own departments or agencies for the purposes of any work of planning, designing, construction or operation, or make contracts or other arrangements for such purposes with Government departments, local authorities, educational and research institutions or any person or body of persons;

Provided, however, that the Board shall not, without the prior sanction of the Minister, enter into any such contract or arrangement with any individual or firm not resident in Ceylon or with any company not formed and registered in Ceylon.

15. (1) In the undeveloped area the Board shall, notwithstanding the provisions of part VI of the Crown Lands Ordinance, be the sole authority responsible for and charged with the administration of that Ordinance, and accordingly every reference in the provisions of that Ordinance to the land and law officer or any other officer of Government shall, with any duties in respect of Crown lands shall, for the purposes of the application of that Ordinance in the undeveloped area, be deemed to be a

Crown lands.

(c) The Board shall, notwithstanding anything in any law relating to, or the sale authority for, public or other lands, have the right to acquire to the extent of such portion of the Government-owned land in the area specified in the notice published by the Board to acquire or by any other written law relating to Crown lands.

(2) The Board may purchase Crown land in the undeveloped area for any of its purposes or reserve any such land for future use.

Compulsory acquisition of land in area of authority.

16. (1) Where any land or any interest in any land in the area of authority is required by the Board for any of its purposes, that land or interest may be acquired under any law or special law by the Government for the Board, and the provisions of that law shall, save as otherwise provided in subsection (2), apply for the purposes of the acquisition of that land or interest.

(2) In any case where any land or any interest in any land is to be acquired under the land acquisition law for any purpose of the Board and the public notice of the intention to acquire that land or interest is published or required to be published at any time within the period of three years commencing on the appointed date, the following provisions shall apply for the purpose of determining the amount of compensation to be paid in respect of that land or interest, notwithstanding anything to the contrary in the land acquisition law :-

- (a) the market value of the land shall be deemed to be the market value which the land would have had at the appointed date if it then was in the same condition as it is at the time of acquisition;
- (b) in ascertaining the market value of the land at the appointed date no account shall be taken of any benefit or increase in value which may have accrued, or of any expectation of benefit or increase in value likely to accrue, directly or indirectly, from any work of development or other operation of the Government after the 1st day of October, 1960, or from any work of development or other operation of the Board in pursuance of this Act.

17. (1) The Board may, by notice published and displayed in accordance with the provisions of subsection (2), require every person who claims any right, title or interest to or in any land situated in such part of the undeveloped area as is described in the notice to prefer his claim in writing to the Board within such time as may be specified in the notice.

Possession of land in undeveloped area otherwise than under land acquisition law.

(2) The notice referred to in subsection (1) shall be published in the Gazette and in at least one newspaper in the Babeloese language and one newspaper in the Hindi language and shall be displayed, in accordance with directions of the Board, at conspicuous places in such part of the undeveloped area as is described in the notice.

(3) Where the Board is directed for any of its purposes any land situated in such part of the undeveloped area as is described in the notice published and displayed under the preceding provisions of this section and where no claim of any right, title or interest to or in that land has been made to the Board in preference of that notice, or all the claims made in respect of that

Board, after due and diligent consideration by the Board as to how best to proceed, the Board may take possession of that land and cause any work to be done thereon, notwithstanding that the person who has taken the land in possession may have been taken in possession of that land.

(4) Any person authorized in writing in that behalf by the Board, or any person on behalf of the Board, take possession of any land referred to in subsection (3).

(5) If any person who is authorized in writing by the Board as to the possession of any land referred to in subsection (3) is unable to take possession of that land because of any obstruction or resistance which has been offered, he may, or he may cause an application in that behalf to the Magistrate's Court having jurisdiction over that land to be made, or he may, or he may cause an order of that court directing the Board to deliver possession of that land to him or to any person on behalf of the Board.

(6) Where an order under subsection (5) is issued to the Board by a Magistrate's Court, he shall forthwith execute that order and in writing report to that court the manner in which that order is executed.

(7) For the purpose of executing an order issued by a Magistrate's Court under subsection (5), the Board or any person acting under his direction may use such force as may be necessary to enter the land to which that order relates and to eject any person offering obstruction or resistance and to deliver possession of that land to the person who is duly authorized to take such possession for and on behalf of the Board.

Effect of
possession
under
section 17.

18. (1) Any land of which possession is taken by the Board under section 17 shall, with effect from the date of commencement of such possession, vest absolutely in the Board free from all encumbrances.

(2) No person claiming any right, title or interest to or in any land of which possession has been taken by the Board under section 17 shall, save as provided in subsection (3), be entitled to institute any suit or other legal proceeding against the Board in respect of that land, or of the taking of possession thereof by the Board or of the doing of any work thereon by or under the authority of the Board.

(3) Any person who would but for the provisions of subsection (1) have any right, title or interest to or in any land of which possession has been taken by the Board under section 17 may institute in a court of competent jurisdiction an action against the Board for a declaration of such right, title or interest and for obtaining compensation from the Board in respect of that land.

(4) The amount of compensation which is to be awarded to any person in an action under subsection (3) shall, save as otherwise provided in subsection (b), be determined on the basis as which compensation would be determined under the law of tort if the land in respect of which compensation is to be awarded were injured under that law.

(5) These powers may be exercised to be awarded to any person if such person under sub-section (2) in respect of a kind of work mentioned has been found by the Board to have done within the period of three years commencing on the appointed date, the provisions of paragraphs (a) and (b) of sub-section (2) of section 16 shall apply for the purpose of determining the amount of such compensation.

19. The Board may -

General powers.

- (a) acquire and hold any movable or immovable property and dispose of any movable or immovable property acquired or held by it;
- (b) cause the construction of such dams, lowwees, reservoirs, power houses, power structures, electrical transmission lines and sub-stations, main lines, roads, irrigation, sanitation and drainage canals, and such other works and structures, as may be required;
- (c) stock fish reservoirs and watercourses with fish;
- (d) undertake resettlement of the population displaced by its operations;
- (e) undertake measures for the prevention of malaria and other diseases; and
- (f) execute such other works, and carry out such other operations, as may be necessary for the purpose of discharging its functions under this Act.
- (g) establish and finance co-operative societies;

Special powers in respect of undeveloped area.

20. (1) The written laws for the time being specified in the First Schedule to this Act shall have effect in the undeveloped area subject to the modification that it shall be lawful for the Board -

- (a) to make or issue for the whole or any specified part of the undeveloped area any by-law, regulation, order or notification under any such written law, and
- (b) to exercise and discharge in the undeveloped area or any part thereof all or any of the powers or functions vested by any such written law in any officer or person,

in like manner as though references in any such written law to the authority, officer or person empowered to make or issue such by-laws, regulations, orders or notifications or to exercise or discharge such powers or functions include references to the Board.

(2) No officer or person in whom any powers or functions are vested by any written law for the time being specified in the First Schedule to this Act shall, within the undeveloped area, exercise or discharge any of those powers or functions except where necessary for the reasons of executing or carrying out any contract or agreement made by the Board under sub-section (2) of section 16.

(3) The Board may -

- (a) by by-laws made under section 22 of this Act apply and provision of any written law for the time being in force specified in the Second Schedule to this Act, with or without modification, to any part of the undivided area which is not within the operation of such written law, or
- (b) make for any part of the undivided area which is not within the operation of any written law for the time being specified in the Second Schedule to this Act a by-law which could, if such part had been within the operation of such written law, have been made by the appropriate local authority.

(4) Any power or function which the board is authorized by any clause (b) of subsection (1) to exercise or discharge, may be exercised or discharged on behalf of the board by any member of the Board or by any local officer of the Board as authorized in writing in that behalf by the Chairman.

21. (1) The Board may make rules in respect of all or any of the following matters :- Lower to make rules.

- (a) any matter which has to be determined under subsection (2) of section 5;
- (b) the appointment, promotion, dismissal and disciplinary control of its officers and servants;
- (c) the meetings of the Board and the quorum for and the procedure to be followed at such meetings.

(2) No rule made under subsection (1) shall have effect until it has been approved by the Minister.

(3) The Minister shall not, without the concurrence of the Minister of Finance, approve of any rule made by the Board in respect of any matter referred to in paragraph (a) or paragraph (b) of subsection (1).

22. (1) The Board may make by-laws in respect of all or any of the following matters :- Lower to make by-laws.

- (a) any matter which is required by this Act to be prescribed or for or in respect of which by-laws are required or authorized by this Act to be made;
- (b) the control of the use of water for irrigation within the area of authority;
- (c) the prevention of the pollution of water within the area of authority;
- (d) the prevention of damage to, or the obstruction of, channels in the area of authority;
- (e) the conditions, restrictions and impositions subject to which any rate imposed under this Act shall be levied;

- (f) the regulation, whether in a necessary number or otherwise, of -
- (i) water for the supply of water for irrigation, and
 - (ii) water or fees for the supply of water for industrial or domestic purposes;
- (g) the regulation of fishing in waters within the area of authority;
- (h) the regulation of navigation within the area of authority;
- (i) the ejection of persons trespassing on such lands within the undeveloped area as are under the control of the Board;
- (j) the regulation of the transport or movement of cattle, grain and other agricultural produce within the undeveloped area;
- (k) the regulation of the use of roads within the undeveloped area;
- (l) the regulation of the erection of buildings within the undeveloped area.
- (2) No by-law made under subsection (1) shall have effect until it has been approved by the Minister, confirmed by the Senate and the House of Representatives, and published in the Gazette.
- (3) Every by-law made under subsection (1) and approved by the Minister and confirmed by the Senate and the House of Representatives shall upon its publication in the Gazette be as valid and effectual as if it were herein enacted.

An Extract ~~from~~ of the Gal Oya Development Board Act,
1956 Revision.

APPENDIX II

1. SET "A" - Costs and Benefits computed by the GOPEC at different rates of interest -:

Time Horizon - 50 years

<u>Discount Rate</u>	<u>B/C Ratio</u>	<u>Internal Rate of Return</u>	<u>Net Present Value (Rs. mln.)</u>
3%	0.89	.021	- 61.4
4%	0.79	.021	-108.2
5%	0.70	.021	-138.9
6%	0.62	.021	-158.5
7%	0.55	.021	-170.5
8%	0.50	.021	-177.3
9%	0.47	.021	...
10%	0.41	.021	-181.1

2. SET "B"

Additional Assumptions : Benefits increase @ 10% from 29th yr. (1977/78)
 : Operating Costs increase @ 20% -do-
 : An additional capital cost of Rs 10 mln. during 1975/76.

Time Horizon - 50 years

<u>Discount Rate</u>	<u>B/C Ratio</u>	<u>Internal Rate of Return</u>	<u>Net Present Value - (Rs mln.)</u>
3%	0.70	- 1.0	-438.3
4%	0.68	do	-349.1
5%	0.65	do	-293.5
6%	0.62	do	-258.3
7%	0.57	do	-235.2
8%	0.53	do	-219.4
9%	0.49	do	-208.0
10%	0.44	do	-199.2

3. SET "C" -

Additional Assumptions : Benefits increase @ 20% from 29th year
 -: Operating Costs - do -
 : Additional capital cost of Rs 10 mln during 27th yr.

Time Horizon - 50 yrs.

<u>Discount Rate</u>	<u>B/C Ratio</u>	<u>Internal Rate of Return</u>	<u>Net Present Value - (Rs mln.)</u>
3%	1.78	.073	1,420.4
4%	1.60	do	815.4
5%	1.41	do	431.7
6%	1.23	do	188.4
7%	1.05	do	34.9
8%	0.89	do	- 61.5
9%	0.76	do	- 120.8
10%	0.64	do	- 156.5

4. SET "D"

:Benefits increase @ 20% from 29th year (1977/78)
 - do -
 Additional Assumptions--:Op. Costs
 :Additional capital cost of 10 mln. during 27th year

Time Horizon - 50 years

<u>Discount Rate</u>	<u>B/C Ratio</u>	<u>Internal Rate of Return</u>	<u>Net Present Value (Rs. mln.)</u>
3%	0.69	- 1.0	
4%	0.68	do	
5%	0.67	do	
6%	0.64	do	
7%	0.61	do	
8%	0.58	do	
9%	0.53	do	
10%	0.49	do	

5. SET "E"

:Time Horizon increased to 100 yrs.
 :Benefits continue as as 50th year in GOREC's data
 -do-
 Additional Assumptions --:Op. Costs
 :Additional Capital Costs
 @ Rs. 5 mln during 50th and 51st years
 @ Rs. 5 mln. during 75th and 76th years

<u>Discount Rate</u>	<u>B/C Ratio</u>	<u>Internal Rate of Return</u>	<u>Net Present Value (Rs. mln.)</u>
		0.34	
3%	1.08		
4%	0.91		
5%	0.77		
6%	0.67		
7%	0.58		
8%	0.52		
9%	0.46		
10%	0.42		

6. SET "F"

:Time Horizon increased to 100 yrs.
 :Benefits increase @ 10% from 29th year
 Additional Assumptions :Op. Costs @ 30% from 29th year and remains static
 : from the 50th year onwards
 :Additional Capital Costs as in Set "E"

<u>Discount Rate</u>	<u>B/C Ratio</u>	<u>Internal Rate of Return</u>	<u>Net Present Value (Rs. mln.)</u>
		.061	13,824.5
3%	1.88		4,572.3
4%	1.52		1,214.3
5%	1.24		79.7
6%	1.03		
7%	0.88		

