



The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

ECONOMICS, ECOLOGY AND THE ENVIRONMENT

Working Paper No. 16

**Brunei's Quest for Sustainable
Development: Diversification and
Other Strategies**

by

Clem Tisdell

August 1997



THE UNIVERSITY OF QUEENSLAND

ISSN 1327-8231
**WORKING PAPERS ON
ECONOMICS, ECOLOGY AND THE ENVIRONMENT**

Working Paper No. 16

**Brunei's Quest for Sustainable
Development: Diversification and
Other Strategies***

Clement A. Tisdell†

August 1997

* A revised version of a paper presented in a public seminar at the University of Brunei Darussalam, 28 May, 1997. I wish to thank Dr John Asafu-Adjaye, Dr Hans Blomqvist, Haji Ismael Duraman, Dr Shabbir Hussein and Dr James Obben for some background materials or suggestions. The usual *caveat* applies.

† Department of Economics, The University of Queensland, Brisbane, Qld 4072, Australia.

WORKING PAPERS IN THE SERIES, *Economics, Ecology and the Environment* are published by the Department of Economics, University of Queensland, 4072, Australia, as follow up to the Australian Centre for International Agricultural Research Project 40 of which Professor Clem Tisdell was the Project Leader. Views expressed in these working papers are those of their authors and not necessarily of any of the organisations associated with the Project. They should not be reproduced in whole or in part without the written permission of the Project Leader. It is planned to publish contributions to this series over the next few years.

Research for ACIAR project 40, *Economic impact and rural adjustments to nature conservation (biodiversity) programmes: A case study of Xishuangbanna Dai Autonomous Prefecture, Yunnan, China* was sponsored by the Australian Centre for International Agricultural Research (ACIAR), GPO Box 1571, Canberra, ACT, 2601, Australia.

The research for ACIAR project 40 has led in part, to the research being carried out in this current series.

For more information write to Professor Clem Tisdell, Department of Economics, University of Queensland, Brisbane 4072, Australia.

BRUNEI'S QUEST FOR SUSTAINABLE DEVELOPMENT: DIVERSIFICATION AND OTHER STRATEGIES

**Clem Tisdell, Department of Economics
The University of Queensland, Australia 4072**

Abstract

Essentially Brunei's economy is a rentier economy of which several types exist. While the economy of Brunei has similarities with MIRAB economies in the Pacific, as explained, important differences exist. Most of Brunei's rental income is derived from extraction of hydrocarbons. An important sustainability issue for Brunei is how much of this rent to consume, how much to invest and, of this investment how much to invest in its domestic economy compared to its investment abroad. The same types of issues arise in relation to the returns from its invested capital funds.

One of the strategies which Brunei has stressed for sustaining the income of its citizens is the diversification of its economic activity. This requires, amongst other things, that the size of its public sector be reduced relative to its private sector. Presently the public sector is an important vehicle for distributing Brunei's rental income and this impedes diversification of its economy. It is recommended that less of these rents be distributed through employment of Bruneians in the public sector and more via their employment in the private sector, e.g., via private employment incentives such as work subsidies and subsidised fringe benefits, such as superannuation. This can raise Brunei's national income.

Doubts are raised about the desirability of Brunei's goal of diversification via industrialisation as set out in its earlier National Development Plans, but there are now signs that this goal is being modified. The question is raised of the guidance which standard economic theories of industrial development provide to Brunei in selecting industries for its diversification. It is concluded that these provide an inadequate guide for its development and this has implications for Brunei within APEC and Asean.

The final 'big' question raised is does Brunei need to diversify and expand its private sector in order to sustain its income? Given appropriate investment and accumulation of its rental income and of its returns on its capital investment funds, this may not be essential for Brunei's economic sustainability. Nevertheless, diversification (a larger private sector) can provide Brunei with a higher level of income. A further matter raised is whether 'forced' tapering off of Brunei's hydrocarbon extraction, as a part of government policy, is desirable for economic sustainability and transitional reasons.

BRUNEI'S QUEST FOR SUSTAINABLE DEVELOPMENT: DIVERSIFICATION AND OTHER STRATEGIES

1. INTRODUCTION

Brunei is fortunate in having large oil and natural gas deposits relative to its population, and yet this is also to some extent a misfortune. The rents (the so called unearned income) from these resources have become an impediment to the diversification of Brunei's economy and impede the long-term sustainability of its economic activity and income levels. Its situation is similar to that of many other rentier-type economies as described by Kakazu (1994). Such economies receive high levels of income from rents such as from minerals or other natural resources. A number of economies of this type exist in the Pacific apart from Brunei, e.g., Nauru, and in the past, Kirabati and in the Middle East. Kakazu (1994) argues that the Northern Marianas receives considerable rental income from tourism because of its proximity to Japan and that it also has the characteristics of a rentier economy with the possibility that its tourism resources may be destroyed by over utilization.

Brunei as a rentier economy is, like the Northern Marianas, heavily dependent on guest workers for the operation of its economy. In that respect, it differs markedly from another set of small rentier economies described by Bertram and Watters (1985, 1986) as MIRAB economies. These small Pacific (mostly island) economies obtain their rent or 'unearned' income from foreign aid and from remittances sent by their nationals who have migrated abroad. (See also Bertram 1986; Tisdell, 1990, Ch. 10; Poirine, 1994). The acronym for these economies is derived as follows:

MI	-	migration
R	-	remittances

A - aid

B - bureaucracy

'Bureaucracy' indicates a large government sector dominating these economies. Such economies include Tuvalu, Kirabati, Marshall Islands, Cook Islands and French Polynesia plus others.

Most foreign aid is channelled through the public sector in MIRAB economies. Outside this sector, indigenous private commercial activity is little developed and a subsistence sector exists which is dependent partially on remittances from abroad and from those family members employed in the public sector.

As in Brunei, incomes in MIRAB economies are higher and working conditions are better in the public sector than in the private sector. To a large extent, employment in the public sector acts as a mechanism to distribute foreign aid or rental income. While such a system may seem just, it hampers the growth of private commercial industry by reducing the supply of local labour and talent to private industry. Furthermore, private industry may be crowded out by investment in the public sector. Remittances may also undermine the motivation of local recipients of these to put in their 'best' economic effort and so reduces the efficiency of their subsistence sector. All these factors, as well as the small size of MIRAB economies, makes it difficult for MIRAB economies to diversify their production and particularly to promote the growth of an indigenous private commercial sector. Hence, they experience some of the problems which Brunei encounters.

Nevertheless, Brunei is quite different to MIRAB economies in several respects. Its rent or surplus is derived from its own natural resources, not foreign aid. Because of this aspect, it has much more autonomy in its economic decision-making than MIRAB economies. Furthermore, Brunei is a source of remittances and a haven for temporary migrants as guest

workers whereas the opposite situation occurs for MIRAB economies. However, like MIRAB economies, Brunei receives a rental income, a significant amount of which is distributed through employment in the public sector. This together with the dominating economic impact of the oil and gas sector, appears to be a factor crowding out independent private industry controlled and developed by Bruneians.

Brunei, like other mineral-rich exporting countries, has to make decisions about how much of its rental income to invest abroad and how much to allocate to its domestic economy and in what way. Let us consider this matter first before discussing some of the strategies which Brunei may consider for diversifying its economy.

2. ALLOCATION OF RENTAL INCOME – INVESTMENT ABROAD VERSUS USE AT HOME

In order to sustain income in the future, Hartwick (1977) recommends that rent from the depletion of non-renewable natural resources, such as hydrocarbons, be invested in man-made capital. This has become known as the Hartwick rule for sustainability. Considerable doubts have been expressed about the validity of Hartwick's rule as a means of sustaining consumption (Ströbele, 1984; Müller and Ströbele, 1985; Tisdell, 1997). Furthermore, Hartwick's rule pays no attention to the specific type of issues faced by Brunei and its need to allocate funds to provide current income support for Bruneians. In reality, it is politically and socially unacceptable in Brunei's case to ignore the latter aspect, and it has not been overlooked by the Government of Brunei. If the latter aspect were ignored, then little of Brunei's rental income might be allocated for use in Brunei. Most of it is likely to be invested abroad. This is likely to be so if Brunei's sole aim were to maintain the *financial* return on the use or investment of rental received by it. Let us *assume* that Brunei's aim is to maximise the financial return from its rental income by allocating it between investment opportunities in Brunei and those in the rest of the

world. The ‘worst’ scenario would be one in which returns on investment abroad are always higher than for all investment in Brunei. In that case, all of Brunei’s rental income would be invested abroad and none of these funds would be invested in Brunei. This case can be illustrated by Figure 1. Let the line AC represent the internal rate of return from investment of rental income abroad and DF indicate that for investment in Brunei. If Brunei’s total rental income is X_R' its financial return is maximised by investing it all abroad. If on the other hand, line GH represents the internal rate of return on investment in Brunei, X_B^* of funds would be allocated to Brunei and X_R^* should be invested abroad to maximise returns on funds. If a purely financial criterion is adopted, the proportionate investment of rental income in Brunei would then be small.

Insert Figure 1

The above strategy of maximising financial returns from rental income does not make any of the rental income available for consumption. There is no rule for drawing on rental income for consumption purposes. If the real rate of return on these funds happened to be 10 per cent per year, then the interest (in the absence of inflation) could be used for consumption purposes and the capital value of the fund sustained. If a smaller amount is withdrawn for consumption purposes, financial assets will increase. A decision has to be made about whether to increase, decrease or hold constant financial assets held by Brunei as a result of investing its rental income. This decision will have implications for the sustainability of future consumption by Bruneians.

A decision also has to be made by the Government about how to distribute any rental income or interest on such income to Bruneian citizens. To do so by means of a monetary *grant* to families and individuals may discourage local development and industriousness.

Another alternative would be for Bruneians to all be given shares in all enterprises involved in the recovery of oil and gas and in all financial investments made using previous rental income. What to do with the returns or dividends received and with these shares would then become a matter purely of private decision-making by individual Bruneians. However, many Bruneian families may lack the skill or even the will to manage their investment portfolios wisely and this may adversely affect their heirs and successors. Inequality of income may increase. This option therefore may not be considered to be suitable by the Government of Brunei.

Consideration may be given to using some of the rental income in Brunei to stimulate employment of Bruneians and provide them with a socially acceptable wage or level of income. Investment in infrastructure and other publicly available goods provides some redistribution of rental income in Brunei since these facilities can be used directly by all Bruneians. It, however, appears that a few Bruneians are employed in construction of such infrastructure; most of those employed are guest workers. At the present time, few Bruneians appear to be employed in physical work or in commercial work. Largely this is because wage rates and employment conditions for Bruneians are much more favourable in the public sector.

This situation might be rectified by making a subsidy available for employment of Bruneians in the private sector, and possibly at the same time reducing benefits for some categories of employment in the public sector. A private employment subsidy will result in greater production than a straight out income transfer or extra employment in the public sector if extra employment in this sector results in very little extra productivity.

This can be illustrated by Figure 2. Suppose that Brunei wishes to maintain a minimum social wage for Bruneians equivalent to OB. Given that the value of marginal productivity of

Bruneian labour in Brunei's private sector is as indicated by line EF, \hat{L} of labour would be employed in the private sector supposing that \bar{L} of Bruneian labour cannot find employment in the public sector. Hence $\bar{L} - \hat{L}$ of Bruneian labour would be unemployed in this case in Brunei.

The *minimum* subsidy to ensure the employment of this surplus Bruneian labour in the private sector is indicated by the area of hatched triangle CFD. This requires a subsidy on a sliding scale which may be difficult to administer. For greater simplicity, a subsidy of AB for employment of surplus Bruneian labour in the private sector might be considered. This would cost the Government an amount equivalent to the area of rectangle GFDC. This is less than if a straight income transfer is made to labour because in that case, the cost to the government would be equal to the area of rectangle HJDC.

Insert Figure 2

Furthermore, in this case the economy forgoes a significant contribution to output equivalent to the area of quadrilateral HJFC. Similarly, if the surplus Bruneian labour force is employed in the public sector, the cost will be the same to the Government as in the straight income transfer case and the loss of production in the economy will be the same also if marginal productivity of employment in the public sector is zero, or nearly the same if it is near zero.

While instituting an employment subsidy for Bruneians in the private sector (and reducing support for their employment in the public sector) involves some practical difficulties, it seems desirable on productivity grounds. A mechanical type of subsidy need not be employed. Improving conditions for those employed in the private sector e.g. subsidised retirement benefits, could help to rectify present employment imbalances between the public and private sectors.

Increased employment of Bruneians in the private sector may provide a better basis for the long-term sustainable development of Brunei and diversification of its economy.

3. DIVERSIFICATION OF BRUNEI'S ECONOMY

3.1 Background

While Brunei is well placed to enter the 21st Century, and should have sufficient income from sales of oil and natural gas and from its investments abroad to sustain its income until around 2040, Brunei's leaders are worried about the sustainability of Brunei's income beyond this time. It is appropriate that they should be concerned since the likely depletion of Brunei's commercial reserves of hydrocarbon by this time will affect Bruneians currently under about 25 years of age during their expected lifetime and those who will be born in the not too distant future. The issue therefore, is thus starting to become more pressing. It is an issue which already has been the focus of Brunei's policies.

Brunei's economic policy has, since the beginning of its Fifth National Development Plan, been directed towards three objectives:

- (1) diversification via industrialization,
- (2) industrialization via privatization, and
- (3) privatization via Bruneization (Ali, 1992, p. 196).

Ali (1992, p. 197) claims that progress in achieving these goals has been slower than expected and certainly it is less than desired. (This is reflected in the fact that 38.9% of employment in Brunei in 1971 was in the public sector, in 1981 46.6% and in 1991 45.9%. The size of the public sector has failed to decline in terms of relative employment to any significant extent.) The attainment of these objectives is seen as an end to achieving income sustainability once Brunei's commercial hydrocarbon reserves are depleted.

In Brunei's case the process of achieving these goals is not an easy one. Factors which limit the process include:

- (1) Brunei's comparatively small home market.
- (2) Strong economic competition from neighbouring countries e.g. Singapore and Malaysia.
- (3) Limited natural resources, apart from hydrocarbons.
- (4) The need to foster a strong independent work ethic and high managerial motivation amongst Bruneians. Social and Islamic religious values seem to be more important than commercial values, and where there is conflict, the former tend to prevail. How to preserve social and Islamic values and adjust to commercial realities in a modern competitive world is of importance. It should be noted, however, that Islam is not inconsistent with commercial activity and trade. Indeed, it has been suggested that originally conversion to Islam in Southeast Asia was in part because Islam was associated with traders, e.g., the Arabs, and because it was adopted by better-off commercial groups in Southeast Asia (Devahuti, 1965).

In relation to Brunei's development goals, it is unclear why such a high level of importance has been placed on industrialization. Such emphasis could result in the neglect of Brunei's potential for developing its service (tertiary) industries such as tourism, and also particular types of agriculture.

An important issue in relation to economic diversification and restructuring of economies is the extent to which these should be left to free market forces. The associated issue is the extent to which government support is justified for economic diversification or structural change. Let us consider this matter in relation to various theories of trade.

3.2 Industrial development theories of trade and selection of industries

FREE TRADE AND COMPARATIVE ADVANTAGE:

Classical economists have argued that nations should specialise in production according to their comparative advantage and that this specialization will be promoted by free trade. Heckscher and Ohlin showed that countries are likely to have a comparative advantage in producing goods and services which make greatest use of their relatively abundant factors of production. In the case of Brunei for example, it has relatively abundant hydrocarbon deposits and so one might expect it to specialize in the extraction of these.

These theories are static. They do not consider changes in comparative advantage and the mechanisms involved in these. Clearly Brunei will no longer have a comparative advantage in hydrocarbon extraction once most of its reserves are depleted.

Will Brunei's economy automatically restructure in a socially acceptable way to take advantage of its new set of comparative advantages? In what new industries will Brunei have a comparative advantage? Should the government of Brunei assist its economy to restructure in line with its predicted new comparative advantages, how should it do this and when should it start to do this? These are all important questions.

Those who strongly believe in the efficiency of the price mechanism will argue that no government intervention is required and that any such intervention is likely to do more harm than good. On the other hand, there are those who argue that the government can play a valuable role as a coordinating body in assisting economic change. For example, the Ministry of International Trade and Industry (MITI) has played a useful role in coordinating structural change in Japan in accordance with changes in the international competitiveness of Japan's industries. Kakazu (1994) in discussing the Commonwealth of the Northern Mariana Islands (CNMI) argues that they have become overspecialized in tourism and that CNMI needs to

diversify its economy. He says, 'In order to diversify the CNMI economy good indicative planning with strong policy supports is essential. Policy measures must be designed to strengthen the competitive edge of local industries' (Kakazu, 1994, p. 87).

The main problem of free restructuring of an economy is that it may be adaptive rather than anticipatory. In this case, insufficient restructuring of Brunei's economy may not occur until *after* its hydrocarbon reserves are depleted. There may therefore, be a period in which the economy performs poorly before adequate learning and restructuring occurs. However, a tapering off of hydrocarbon extraction for physical reasons or as a part of government policy *might* assist with smoother transition. (However, see later discussion in Section 5.) A gradualistic rather than a 'big-bang' approach to structural adjustment in Brunei seems desirable. The conservation oil policy introduced in 1981 could have been interpreted as part of such a process. The aim was to reduce Brunei's production to 150,000 barrels per day by 1988. In 1992, production was 152,000 barrels per day but since then has been allowed to increase so that in 1995 it stood at 179,000 barrels per day. Gas and LNG production have also risen in the period 1990-95.

IMPORT SUBSTITUTION STRATEGIES:

If the government of Brunei is to select industries to sponsor prior to exhaustion of its hydrocarbon reserves, how should it go about it? A suggestion has been made by Ali (1992) that it might consider the composition of its imports. Ali argues that some imported goods could be economically produced in Brunei with prospects of limited exports in some cases. In his view, there are some products for which scale economies would not be an important limitation. Apart from manufactured goods, this may also be true for some agricultural tropical crops such as fresh

fruit and vegetables. It should be noted that import substitution strategies are not popular at present.

EXPANSION OF EXISTING BRUNEI INDUSTRIES:

There is scope for expanding a number of existing industries in Brunei to earn more foreign income and provide employment. The tourism sector can be expanded especially if tourism circles or routes involving Southeast Asia (particularly Borneo) are promoted. But this may require Brunei to give more attention to catering for foreign tourists, e.g., more flexibility in banking hours, reduction in visa requirements, for instance, Australians must apply in advance for a visa to Brunei but do not need to do so for many other Southeast Asian countries. Brunei should give more attention to the type of tourist that it wishes to attract. Business obtained by Royal Brunei Airlines could be increased and Bandar Seri Begawan could become a major international airport if it is given adequate investment and promotion. Despite the fact that Brunei faces a lot of competition from Singapore, Thailand and now Malaysia, Brunei's economic opportunity could come in the future. Detailed investigation is required into existing industries (not dependant on hydrocarbon extraction) which could be expanded in Brunei.

NEW INDUSTRIES BASED ON NEW TECHNOLOGY:

New technologies play an important role in international trade. Theories called neo-technology trade theories have been developed to explain how international trade and development is influenced by new technologies. Multinational companies play an important role in the use and transfer of new technologies. A country which develops a superior new commercial technology can obtain a monopoly profit from this for a time. Countries which can develop a stream of such new technologies, like the United States or Japan, can make considerable economic gains. Nevertheless, it is costly and risky to develop new technology and

a country really needs some multinational corporation to get maximum benefit from its research and development efforts. Thus it is very difficult for a small country like Brunei to make effective use of this new technology strategy.

Singapore, while not a leading new technology producer and also a comparatively small economy has encouraged multinational corporations to undertake direct investment there. Thus Singapore is able to share in technological production and marketing associated with such technology. There appears to be fewer limitations in direct foreign investment in Singapore than in Brunei. Basically, given its resource base, Singapore has to live on its wits. It has been active in promoting a growth triangle; the Singapore-Johore-Riau Triangle (Kakazu, 1994, pp. 184-186). Whether there is scope for Brunei to create similar triangles or establish regional international cooperative arrangements in industrial production involving, say, itself and Borneo remains to be seen.

In fact Brunei is actively promoting a new growth 'triangle' (Department of Foreign Affairs and Trade, 1995; *Brunei Bulletin*, 24 February, 1997, p.10) namely the East Asean Growth area consisting of Brunei, areas of Indonesia, e.g., Kalimantan, Malaysia's Sarawak and Sabah and Labuan and parts of the Southern Philippines. Brunei aims to become a service hub for this region, distributing commodities and services and developing tourism from the hub. The *Brunei Bulletin* 24 February, 1997, p.12 reports that it is hoped to establish Brunei as a Service Hub for Trade and Tourism (Shutt) in the region by 2003. This seems to indicate that Brunei is now putting less emphasis on industrialisation as a diversification and sustainability strategy and more stress on the development of service industries. This seems to be wise, but of course, service industries, especially tourism are internationally quite competitive. Nevertheless, Brunei certainly has the potential to become a tourist hub for east Asean and to develop a leading

position in some other service industries. The potential of these service industries to employ Bruneians needs further investigation, e.g., to what extent will Bruneians be employed in the hotel sector?

It is interesting to consider the distribution of employment of Bruneians by major industry groups (see Table 1). In 1991, citizens of Brunei constituted 51.09% of Brunei's workforce. The accounted however for only 14.67% of employment in Construction, 18.67% of employment in Manufacturing and 29.15% of employment in Wholesale and Retail Trade Restaurants and Hotels. So they were greatly under represented in these groups. They were also somewhat under represented in Financing, Insurance, Real Estate and Building Services (43.69%). They are more than represented in Electricity, Gas and Water (84.04%), Community and Social and Personal Services (67.08%), Transport, Storage and Communication (59.55%), slightly over represented in Agriculture, Forestry and Fisheries (56.9%) and evenly present in Mining and Quarrying (50.28%).

Insert Table 1

On current indications expansion of the manufacturing industry in Brunei would not lead to many new positions which would be sought by Bruneians. While expansion in the Wholesale and Retail Trade, Restaurant and Hotel sector of Bruneians may not result in increased employment of many Bruneians, this sector it provides their second biggest employment absolutely after the Community sector.

4. APEC AND BRUNEI'S DEVELOPMENT

The world is increasingly becoming divided into regional free trade associations of which the European Union (EU) and the North American Free Trade Agreement (NAFTA) are prime examples. APEC is developing and Brunei is a member of APEC. To the extent that APEC

results in increased freedom of international trade, it will expand markets for those industries in Brunei which become internationally competitive. On the other hand, it may limit Brunei's ability to provide government assistance for restructuring its economy. This seems to indicate that small countries like Brunei should be given special consideration.

The EU has had to take into account the disparate position of its member states, making concessions to small economies such as Malta and those with structural problems. APEC will also need to work out similar policies.

The *Brunei Bulletin* (24 February, 1997, p.10) reported that the Brunei Government is committed to liberalising trade, particularly within the Asean region and more widely, the APEC region. It is intended to establish an Asean free trade zone by 2003, and the Manila Action Phase calls for significant tariff cuts by APEC members by the year 2000. Nevertheless, the Minister of Industry and Primary Resources, Pehin Data Awang Haji Abdul Rahman Taib has called for special and differential treatment for least developed countries by the World Trade Organization (WTO) and as mentioned above, some allowances may need to be made within APEC for the special problems faced by small states within it. In any case, Brunei has been very active in trying to promote new trade relations in its region. Nevertheless sceptics (Case, 1996, p.134) suggest that it will be difficult for Brunei 'to promote self-reliance at home and new trade relations in the region'.

5. DOES BRUNEI NEED TO DIVERSIFY AND DEVELOP ITS PRIVATE SECTOR TO SUSTAIN ITS INCOME? MORE ON TRANSITION

The need for Brunei to diversify its economy and develop its private sector in order to sustain the income levels of Bruneians should not be taken for granted. In fact this is unnecessary if Brunei can accumulate sufficient investment funds and manage these wisely so as to provide sufficient future annuities. This is not inconsistent with the fact (discussed earlier)

that Brunei might earn a larger income by increasing the employment of Bruneians in the private sector relative to their employment in the public sector.

Taking a simple case, it is possible to garner whether Brunei's accumulated investment funds can sustain the income levels of Bruneians. If for example, P represents Brunei's relevant population level, \hat{y} is the desired income or expenditure level per Bruneian per year, F is the size of Brunei's investment fund, r is the rate of return on this fund and k is the income multiplier and \hat{Y} is the desired level of national income, the investment fund will need to be of size

$$F^* = P\hat{y}/rk = \hat{Y}/rk \quad (1)$$

to achieve the target level of income. This is assuming stationary conditions and that all returns are distributed to Bruneians. Thus if the rate of return on the invested funds are 10 per cent and the income multiplier is 2,

$$F^* = \hat{Y}/(0.1 \times 2) = \hat{Y}/0.2 \quad (2)$$

Thus, the investment funds of Brunei if Brunei solely relied on these for economic injections to its economy, would need to five times its desired level of its aggregate income. If the return, however, on its funds happened to be only 5 per cent, then these funds would need to be ten times the level of desired national income and so on. Note that income multipliers in small economy such as Brunei are usually quite low.

The size of Brunei's investment funds are unknown. However, they were estimated in 1994 to be \$US30 billion (*Asia Week*, 1994, p.60) but they may well now be significantly higher. Furthermore, the rate of return on these funds is not known. With a return of 10% on \$US30 billion and a population of 300,000, earnings from the fund per person for Brunei would be \$US10,000 per year and with a multiplier of 2, this would generate income of about \$US20,000 which is approximately the current per capita income level in Brunei. The fund may however

be larger than \$US30 billion and the rate of return lower. The point nevertheless is that Brunei may be able to sustain its present levels of income from returns on its indirect investments after the hydrocarbons reserves run out.

If Brunei's population is increasing (as it is) and if the desired level of per capita income in Brunei rises over time, then the required capital fund for sustainability of income in Brunei must be larger initially and/or there should be appropriate additions to it with the passage of time e.g. by ploughback of some of the returns. Required variations in the investment fund can be mathematically estimated for different possible scenarios.

In practice, matters are more complicated than indicated above. The fund may have to be increased in size to allow for uncertainties and for fluctuations in rates of return. As well, some allowance may need to be made for inflation. Even though Brunei has a large and diversified portfolio of foreign investments, it is not completely insulated against such variations. Nonetheless, the wise accumulation and investment of Brunei's funds can provide Brunei with an annuity to sustain the income of its people. Brunei's accumulated and accumulating investment funds are Brunei's most significant resource for ensuring its future economic sustainability. Thus the appropriate management and accumulation of these funds is of great importance for Brunei's economic future.

Note that Brunei by investing its rental income abroad is able partially to isolate its domestic economy from current variations in its rental income from hydrocarbon extraction. This 'sterilization factor' dampens the so called 'Dutch Disease' effect in Brunei.

It might be thought that one way to help sustain Brunei's economy would be to slow down the rate of extraction of its hydrocarbons. In 1981, Brunei developed such a policy to limit oil extraction but in recent years has relaxed restrictions on oil extraction.

By restricting the rate of hydrocarbon extraction by fiat, Brunei could fail to maximize its natural resource rents and therefore the capital funds available to it for investment to sustain future incomes in Brunei. In addition, such restrictions could be expected to discourage exploration for hydrocarbon deposits because limitations on the workings of any finds will reduce the expected return on investment in exploration. These factors together with the fact that rents from mining can be isolated from the local economy weakens the argument that the rate of extraction of hydrocarbons should be artificially limited in order to sustain the income of Bruneians.²

6. CONCLUDING COMMENTS

Brunei suffers from serious structural economic problems as a result of its high degree of dependence on rents from oil and natural gas; rents which are not sustainable in the long-term. While these rents are received it is very difficult to restructure and diversify Brunei's economy. This is made more difficult by the use of the public sector as the main means of redistributing that part of rent to be used for personal income. Attention needs to be given to the distribution of more of this rent through the employment of Bruneians in the private sector.

A part of Brunei's rent is used at present to pay for guest workers which constitute about one-third of its labour force. When Brunei's hydrocarbon reserves are exhausted, it will be difficult for Brunei to sustain its degree of dependence on migrant workers. They probably provide Brunei with an extra surplus or rent at present. In the foreseeable future Brunei may however, wish to consider scaling down this dependence which will mean that Bruneians as well as doing more skilled jobs, will need to do some of the less pleasant ones done by guest workers. Kakazu (1994) mentions in relation to the Northern Marianas that a high level of guest workers

there has caused social tension and suggests for this reason, dependence on guest workers should be reduced. The volume of guest workers exceed, the absorption capacity of the Northern Marianas. He also suggests that the growth of tourism in the Northern Marianas should be limited for environmental reasons. Otherwise, environmental damage may deter Japanese tourists. I mentioned tourism development in Brunei as a possible growth industry. However, Brunei would also have to be careful to avoid the type of problems experienced by the Northern Marianas.

A review of the theory of international trade was undertaken to see the extent to which it might provide a guide to industrial development and the selection of industries for economic diversification in Brunei.³ Orthodox traditional international theory produces an inadequate guide because it is too static in nature. Some Government intervention in Brunei is likely to be needed to bring about smooth restructuring of its economy because of overexpansion of its public sector and future anticipated depletion of its oil and gas reserves. A start on Brunei's restructuring needs to be done before 'depletion day'. It is not too early now to reduce the size of the public sector. Early efforts at restructuring are likely to be sensible bearing in mind the existence of lags, that learning about industries and skilling takes considerable time and is to a large extent a trial-and-error process, that is an evolutionary one. In order to allow the restructuring of Brunei's economy to proceed with government assistance, Brunei may require special consideration within APEC. However, given wise accumulation and investment of its investment funds, Brunei may not need to depend heavily on diversification for sustainability of its income.

NOTES

1. One objection to Hartwick's rule is that Hartwick does not allow for the depreciation of capital. Nevertheless, sustainability is more likely to be obtained by investing returns than by consuming these.
2. Note that Brunei is a small economy in relation to the rest of the world and only its own self-interest is being considered here. By contrast, it is possible that global income may be sustained for longer if global extraction of non-renewable resources, as suggested for example by H. Daly, is limited. Because of the prisoners' dilemma problem, neo-Malthusian arguments may apply globally but not locally. Locally neoclassical economic theory may apply.
3. *The Seventh National Development Plan 1996-2000* for Brunei Darussalam is not very specific about the industries which Brunei should encourage but says that it should adopt a 'Niche' approach to sectoral development.

REFERENCES

- Ali, Ameer (1992) 'Industrialization or Industries? The Vision and the Viability in Brunei Darussalam'. Pp. 196-205 in A Bakar (ed.) *A Collection of Essays on Brunei Darussalam*, The Academy of Brunei Studies, University of Brunei Darussalam, Gadong, Brunei.
- Asia Week* (1994) "The Bottom Line", August, p.60.
- Bertram, I.G. (1986) "Sustainable Development in Pacific Microeconomics", *World Development*, Vol.14, No.7, pp.809-992.
- Bertram, I.G. and Watters, R.F. (1985) "The MIRAB Economy in South Pacific Microstates", *Pacific Viewpoint*, Vol.26, No.3, pp.497-519.
- Bertram, I.G. and Watters, R.F. (1986) "The MIRAB Process: Some Earlier Analysis in Context", *Pacific Viewpoint*, Vol.27, No.1, pp.47-59.
- Blomqvist, H.C. (1993) "Brunei's Strategic Dilemma", *The Pacific Review*, Vol.6, No.2, pp.171-175.
- Case, W. (1996) "Brunei Darussalam in 1995: New Party Politics and Diplomatic Presence", *Asian Survey*, Vol.34, No.2, pp.130-134.
- Department of Foreign Affairs and Trade (1995) *Brunei, August, 1995*, Department of Foreign Affairs and Trade, Canberra, ACT.
- Devahuti, D. (1965) *India and Ancient Malaysia*, Far Eastern Universities Press Ltd., Singapore.
- Government of Brunei (1997) *The Fourth National Development Plan, 1996-2000*, Economic Planning Unit, Bandar Seri, Begawan.
- Kakazu, Hiroshi (1994) *Sustainable Development of Small Island Economies*, Westview Press, Boulder, Colorado.

- Hartwick, J.M. (1977) 'Intergenerational Equity and the Investing of Assets from Exhaustible Resources', *American Economic Review*, Vol. 66, pp. 972-974.
- Müller, K. and Ströbele, W. (1985) *Wachstums-theori*, Oldenbourg Verlag, München.
- Poirine, B. (1994) "Rent, Emigration and Unemployment in Small Islands: The MIRAB Model and the French Overseas Departments and Territories", *World Development*, Vol.22, No.12, pp.1997-2009.
- Ströbele, W. (1985) *Wirtschaftswachstum bei begrenzten Energieressourcen*, Duncker and Humblot, Berlin.
- Tisdell, C.A. and Fairbairn, I.J. (1984) "Subsistence Economies and Unsustainable Trade: Some Simple Theory", *Journal of Development Studies*, Vol.20, pp.227-241.
- Tisdell, C.A. (1990) *Natural Resources, Growth and Development*, Praeger, New York.
- Tisdell, C.A. (1997) "The Environment and Sustainable Development in the Asia-Pacific: Views and Policies", *Asian-Pacific Economic Literature* Vol. 11, No. 1, pp. 39-55.

Table 1 Employment and Intensity of Employment of Brunei Citizens by Industry Groups
in Ascending Order of Intensity

Group	Number of Brunei Citizens	Intensity: Bruneians Employed in Group (%)
1. Construction	2,088	14.76
2. Manufacturing	760	18.67
3. Wholesale and Retail Trade, Restaurants and Hotels	4,640	29.15
4. Financing, Insurance, Real Estate, Building Services	2,569	43.69
5. Mining and Quarrying	2,648	50.28
Average of All Groups		51.09
6. Agriculture, Fisheries, Forestry	1,239	56.9
7. Transport, Storage and Comm.	3,236	59.55
8. Community, Social and Personal Services	35,486	67.8
9. Electricity, Gas and Water	1,874	84.04

Source: Derived from *Brunei Population Census 1991*, Economic Planning Unit, Ministry
of Finance, Bandar Seri Begawan, Brunei

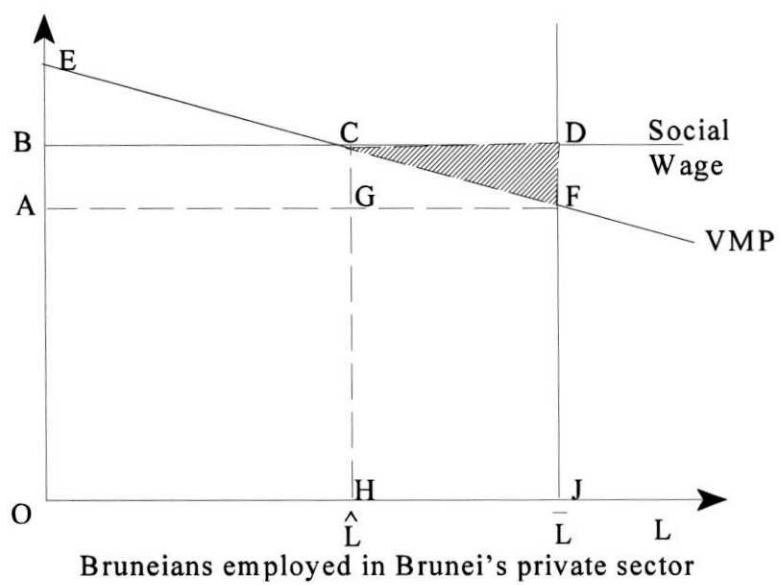


Figure 2: By subsidising employment of Bruneians in its private sector, Brunei may raise its net national product.

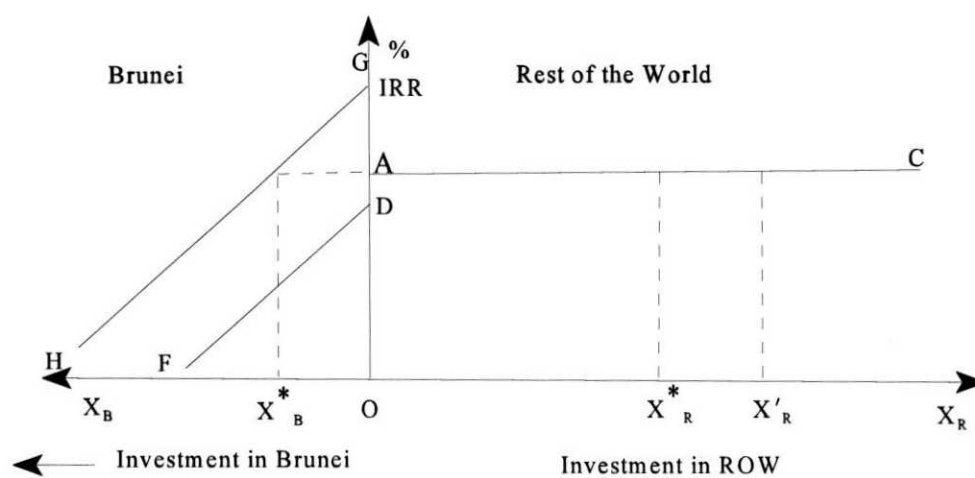


Figure 1: Optimal *financial* investment of Brunei's rental income.

PREVIOUS WORKING PAPERS IN THE *BIODIVERSITY CONSERVATION: STUDIES
IN ITS ECONOMICS AND MANAGEMENT, MAINLY IN YUNNAN, CHINA* SERIES.
RESEARCH PAPERS IN THIS CURRENT SERIES FOLLOWING ON FROM THIS
ABOVE MENTIONED SERIES

PREVIOUS WORKING PAPERS IN THIS SERIES

1. "Biodiversity Conservation: Economics, Gains and Costs in China Illustrated by Xishuangbanna Nature Reserve, Yunnan", Clem Tisdell and Xiang Zhu, February 1994.
2. "Does the Economic Use of Wildlife Favour Conservation and Sustainability?", Clem Tisdell, February 1994.
3. "The Environment and Asian-Pacific, Particularly East Asian, Economic Development", Clem Tisdell, March 1994.
4. "Presenting Requests for Financial Support for Protected Areas: The Role for Environmental Economics and Commonsense", Clem Tisdell, March 1994.
5. "Ranking Inter-country and Inter-regional Requests for Financial Support for Protected Areas: Environmental Economic Guidelines", Clem Tisdell, March 1994.
6. "Conservation, Protected Areas and the Global Economic System: How Debt, Trade, Exchange Rates, Inflation and Macroeconomic Policy Affect Biological Diversity", Clem Tisdell, March 1994.
7. "Environmental and Resource Economics: Its Role in Planning Sustainable Development", Clem Tisdell, April 1994.
8. "Conservation of Biodiversity is the Most Important Aspect of Ecologically Sustainable Development: An Economic Perspective", Clem Tisdell, April 1994.
9. "Ecotourism, Economics and the Environment", Clem Tisdell, October 1994.
10. "Socio-Economic Issues and Strategies for Biodiversity Conservation in China with Observations from Xishuangbanna", Clem Tisdell, November, 1994.
11. "Ecotourism - Its Boundaries and its Economics with Examples from China", Jie Wen and Clem Tisdell, February, 1995.
12. "Reconciling Economic Development, Nature Conservation and Local Communities: Strategies for Biodiversity Conservation in Xishuangbanna, China", Clem Tisdell and Zhu Xiang February, 1995.
13. "Tourism Development in India and Bangladesh: General Issues, and Ecotourism in the Sunderbans", Clem Tisdell, March 1995.

14. "Trends in Tourism Development in China: Issues and Opportunities", Clem Tisdell, March 1995.
15. "Tourism Development and Conservation of Nature and Cultures in Xishuangbanna, Yunnan", Clem Tisdell and Zhu Xiang, May 1995.
16. "Protected Areas, Agricultural Pests and Economic Damage: A Study of Elephants and other Pests from Xishuangbanna State Nature Reserve", Clem Tisdell and Zhu Xiang, May 1995.
17. "Financing Nature Reserves in China - The Case of the State Nature Reserve of Xishuangbanna, Yunnan: Financial Issues, Political Economy and Conservation", Clem Tisdell and Zhu Xiang, May 1995.
18. "Investment in Ecotourism: Assessing its Economics", Clem Tisdell, May 1995.
19. "Rapid Rural Appraisal (RRA), Participatory Rural Appraisal (PRA) and their Application in the Global Environmental Facility (GEF-B) Program in China", Zhu Xiang, August 1995.
20. "The Environment, Biodiversity and Asian Development", Clem Tisdell, September 1995.
21. "Biodiversity, Conservation and Sustainable Development: Challenges for North-East India in Context", Clem Tisdell, September 1995.
22. "Economic and Environmental Perspectives on Sustainable Agricultural Developments", Clem Tisdell, September 1995.
23. "India's Economic Development and Its Environment: General Patterns, Issues and Implications", Kartik Roy and Clem Tisdell, September 1995.
24. "Sustainability of Land Use in North-East India: Issues Involving Economics, the Environment and Biodiversity", Clem Tisdell and Kartik Roy, December 1995.
25. "Criteria for Sustainable Tourism: Why a Cautious Attitude is Needed", Clem Tisdell, January 1996.
26. "Protected Areas, Agricultural Pests and Economic Damage: Conflicts with Elephants and Pests in Yunnan", Clem Tisdell and Zhu Xiang, January 1996.
27. "Alternative Economic Instruments for Regulating Environmental Spillovers from Aquaculture: An Assessment", Clem Tisdell, January 1996.
28. "Economics as a Basis for Conserving Nature", Clem Tisdell, February 1996.
29. "Final Report on ACIAR Small Project: 'Economic Impact and Rural Adjustment to Nature Conservation (Biodiversity) Programmes: A Case Study of Xishuangbanna

Dai Autonomous Prefecture, Yunnan, China', Clement A. Tisdell, March 1996.

30. "Tourism in Yunnan Province and the Xishunangbanna Prefecture of China: Achievements and Prospects", Jie Wen, March 1996.
31. 'Developing Community-Based Forestry in the Uplands of Yunnan: Dictates of the Environment and Socio-Economics', Zhuge Ren and Clem Tisdell, April, 1996.
32. 'China's Environmental Problems: Selected Issues and Solutions in Context', Clem Tisdell, May 1996.

PREVIOUS WORKING PAPERS IN THIS SERIES:

1. Governance, Property Rights and Sustainable Resource Use: Analysis with Indian Ocean Rim Examples by Clem Tisdell and Kartik Roy, November 1996.
2. Protection of the Environment in Transitional Economies: Strategies and Practices by Clem Tisdell, November 1996.
3. Good Governance in Sustainable Development: The Impact of Institutions by K.C. Roy and C.A. Tisdell, November 1996.
4. Sustainability Issues and Socio-Economic Change in the Jingpo Communities of China: Governance, Culture and Land Rights by Ren Zhuge and Clem Tisdell, November 1996.
5. Sustainable Development and Environmental Conservation: Major Regional Issues with Asian Illustrations by Clem Tisdell, November, 1996.
6. Integrated Regional Environmental Studies: The Role of Environmental Economics by Clem Tisdell, December 1996.
7. Poverty and Its Alleviation in Yunnan Province China: Sources, Policies and Solutions by Ren Zhuge and Clem Tisdell, December 1996.
8. Deforestation and Capital Accumulation: Lessons from the Upper kerinci Region, Indonesia by Dradjad H. Wibowo, Clement A. Tisdell and R. Neil Byron, January 1997.
9. Sectoral Change, urbanisation and South Asia's Environment in Global Context by Clem Tisdell, April 1997.
10. China's Environmental Problems with Particular Attention to its Energy Supply and Air Quality by Clem Tisdell April 1997.
11. Weak and Strong Conditions for Sustainable Development: Clarification of Concepts and their Policy Application by Clem Tisdell, April 1997.
12. Economic Policy Instruments and Environmental Sustainability: A Second Look at Marketable or Tradeable Pollution or Environmental-Use Permits by Clem Tisdell, April 1997.
13. Agricultural Sustainability in Marginal Areas: Principles, Policies and Examples from Asia by Clem Tisdell, April 1997.
14. Impact on the Poor of Changing Rural Enviornments and Technologies: Evidence from India and Bangladesh by Clem Tisdell, May 1997.
15. Tourism Economics and its Application to Regional Development by Clem Tisdell,

May 1997.