

SOCIAL ECONOMICS, POLICY AND DEVELOPMENT

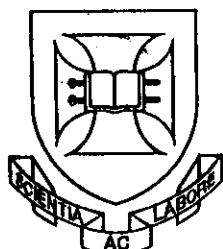
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**Sustainable Development and
Human Resource Capital**

by

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Abstract

SUSTAINABLE DEVELOPMENT AND HUMAN RESOURCE CAPITAL

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Human resources are central to economic development and can be increased in value and productivity by investment in human beings e.g. in their education and health. But for a considerable period in the past economists stressed the importance of the accumulation of man-made physical capital for economic growth and development to the neglect of human resource capital. Nevertheless, in the second half of the 20th century the importance of human resource capital (particularly education) for economic growth came to be recognised. Nevertheless, the implications of the formation of human resource capital for sustainable development were given virtually no in-depth attention but it is important to address this matter, as is done here.

The nature and broad categories of capital are outlined and particular attention is given to human resource capital. While the formation of human resource capital can support sustainable development, it also poses a challenge since this 'formation' draws on or transforms natural resource and environmental capital. Using a neo-Malthusian model, direct routes by which investment in human resource capital may promote sustainable development are outlined. Both improved education and health are likely, for example, to reduce population growth and this is likely to have favourable consequences for sustainable development. Despite it must also be recognised that difficulties (some of which are outlined) exist for sustainably developing human resources.

It is argued that greater equality in the distribution of human resource capital, both within nations and globally, would make a significant contribution to sustainable development. The 'basic needs' approach has considerable merit both from the point of view of justice and as a contributor to sustainable development.

SUSTAINABLE DEVELOPMENT AND HUMAN RESOURCE CAPITAL

1. Introduction

Human resources play a central role in economic development – they are the driving force behind it and from an anthropocentric viewpoint, the purpose for it. Economists, however, have been ambivalent about how human beings are best considered as an economic resource. One way to view human populations is as a capital stock. It is a stock which can be improved in value and productivity by investment e.g. via education, but this investment is embodied in individuals.

The importance of investment in human beings as a source of economic growth, even though recognized by Adam Smith, and other pioneering economists such as Alfred Marshall (1890), as a significant contributor to development, it did not gain prominence in contemporary economics until the second half of the 20th century.

Prior to this changed emphasis, neoclassical formal growth models were developed which portrayed quantities of man-made capital and labour as the major factors contributing to economic growth (Swan, 1956; Solow, 1956). In such models, natural resources (land) and human resource capital played no specific role. By contrast, both natural resources and technological progress were considered to be important factors in economic development in the theories of most classical economists e.g. Ricardo (1817). Subsequently, Solow (1957) and others introduced technological progress into these models as an exogenous variable but not natural/environmental resources.

A change in viewpoint about the importance of human resource capital occurred partly as a result of Denison's empirical analysis of the sources of economic growth (Denison, 1962). Denison found that in more developed countries (e.g. USA), the major portion of recent economic growth could not be attributed to increases in the quantity of capital and labour but was due to improvements in the productive quality of these as a result of technological progress and education respectively, as well as other factors such as the extension of markets. Education to a large extent involves an addition to human resource capital (HRC) and technological progress may also depend significantly on education.

New growth theories such as those developed by Romer (1990, 1986) put major emphasis on education, technical knowledge and economies of agglomeration and scale as contributors to economic growth, but they fail to take account of natural and environmental resources as possible constraints on growth. They therefore ignore sustainability issues raised by neo-Malthusians.

Even though HRC has been widely recognized as a potentially significant contributor to sustainable development (SD) and to be highly relevant to management (Mitchell and Zaidi, 1990), there has been little analysis of the interrelationship between the HRC and SD. The purpose of this essay is to explore this interrelationship. This will involve a consideration of the nature of capital and HRC, a definition of SD for the purpose of this analysis, an outline of the influences of HRC on the achievement of SD. Furthermore, consideration will be given to problems of sustaining and developing human resource capital and to ways of more effectively and efficiently using the world's HRC to achieve sustainable development.

2. The Nature Of Capital, Especially HRC

Classical economists divided productive resources into land (consisting of all natural non-human resources), labour and capital. Alfred Marshall (1961) added entrepreneurship to this list. Traditionally capital has been defined as the produced means of further production. Originally economists mainly had relatively durable man-made physical commodities in mind, such as machinery. Capital accumulation of this type (supporting industrialisation) was seen by Marx as the wellspring of economic growth. Even though Marx objected to the distributional consequences of capitalism (a free market economy), he saw capital accumulation as the main means to reduce scarcity. His hope was that the process of capital accumulation would be organized under socialism to yield a more acceptable distribution of human welfare. Marx was never in doubt about the importance of capital accumulation as a means of achieving economic growth and increased material prosperity; a lesson not subsequently lost on Stalin and Mao Zedong. But this view has not gone unchallenged in recent times. Neo-Malthusians have raised doubts about the long-term effectiveness of this strategy for reducing economic scarcity.

But what, and what is not, capital is far from clear. For example, seed for replanting and stocks of domesticated animals can be regarded as forms of capital even though they are produced by much more than the contribution of humans. Indeed, they are a form of renewable resource stock. Most stock resources (natural and otherwise) have similar properties to capital as traditionally defined by economists. From a sustainability point of view it is useful to divide resources into stock and flow resources.

A human population is a renewable stock resource and in many respects satisfies the traditional definition of capital – humans are produced means for further production. This relationship can be quite direct as in a subsistence economy. For a subsistence family, children can be an important means for sustaining production by the family.

It is useful to look upon human beings as possessing many of the qualities of ‘man-made’ capital (cf. Mincer, 1974). Like machines, human beings are subject to wear-and-tear, have a limited life and from an economic point of view, can become obsolete. Like machines their productivity can be augmented in various way e.g. by embodying skills and ‘knowledge’ and by increasing their robustness. Investment in humans such as in their education and in their health and physique, can add significantly to their productivity. Such investment increases human resource capital.

When an earlier version of this paper was presented at Rabindra Bharati University in India, one professor expressed moral concern that human beings should be regarded as capital. But this approach is not intended to convey the view that individual human beings are equivalent to inanimate capital. They are not. Human beings possess many qualities not possessed by such capital, have a soul, and command intrinsic value in themselves. For different purposes, individuals need to be seen or modeled as different entities.

The relationship between education and human productivity is a relatively obvious one and has been given the greatest attention by economists. But investment in human health may also be of considerable importance. This includes investment in social health such as in improved water and sanitation systems. The latter involve a physical component but assists with the health of individuals and development of children. Indeed, in relation to the development of children,

items which appear on the surface to be consumption items may be more appropriately considered as investment items. This includes adequate and nutritious food for growing children and their access to safe water. Unfortunately, many children today are still denied basic needs in developing countries and there are significant pockets of poverty in more developed countries as well. The incidence of poverty amongst children has risen in many economies in transition e.g. in Russia (Tisdell, 2000b, in press). The impoverishment of children, their lack of access to basic education and health services limits the value of human resources.

Of course, the worth of individuals is not to be judged purely by their productivity and their embodiment of human capital. I accept the view that all individuals are intrinsically equal in the sight of God. Investment in human beings helps individuals to realize their innate potential. But not all that potential need be used for economic purposes. For example, education is not solely and should not be solely undertaken for production purposes. It is also an important vehicle for the transmission of social values and culture. But even in this respect education helps to sustain social and cultural capital (the social fabric) which itself can help to sustain economic activity. Nevertheless, as Raj Kumar Sen (2000, pp.91-92) points out, “the productivity of human beings should be judged in the broader perspective of the quality of life and not in the narrow economic sense only”. Human development should not be evaluated solely in terms of narrow increases in productivity.

3. Human Resource Capital and Sustainable Development

There are many definitions of sustainable development. Thus a variety of concepts exist. Here, I shall adopt the economic definition that sustainable development is development ensuring that the income (or standard of living) of future generations is not less than that of current generations (Tietenberg, 1988). While there are some difficulties with this concept (Tisdell, 1999a) it provides a convenient starting point conceptually. It would, for example, be satisfied if per capita incomes continued to grow even if slowly with the passage of time. This would be a situation of perpetual economic growth.

Optimists believe that sustainable development is possible provided sufficient man-made capital is bequeathed to future generations. Man-made capital is seen as a suitable bequest for future generations. Optimists also believe that technological progress will help to realize sustainable development. Basically they foresee no problem in continuing to transform the available natural/environmental resources stock or capital into man-made capital and other commodities. Their requirements concerning human capital are less clear but it appears that they also see the maintenance and increase of this capital as important for sustained economic growth (as, for example, expressed by the World Bank) but they are less clear about how this is to be best realised. For instance, under structural adjustment policies, greater weight is being placed on free markets and user-pays as a means of providing education and health services – mechanisms which may have an adverse impact on the access of disadvantaged groups to these services.

Furthermore, optimists continue to place great hope in continuing technological progress as a means of reducing economic scarcity. But technological progress does not arise from thin air. Propitious conditions for it need to be maintained. To some extent, advances in scientific and technological knowledge require high levels of skills (education) and other investment. But additional conditions also need to be satisfied such as a social atmosphere and rewards supportive of creativity and innovation. Only once we can be assured that the conditions for continuing technological progress will be satisfied can we have a high level of confidence in the position of the optimists who support weak conditions for SD, who argue that SD will result from economic growth made possible by accumulating man-made capital and transforming natural resource stocks into man-made capital.

The contrasting more pessimistic view is that further conversion of natural resources into man-made capital is liable to endanger SD. Neo-Malthusians believe that the growth optimists are too ready to assume that man-made capital can continue to be substituted for natural resource stock so as to achieve SD. Natural/environmental resource capital also has a productive value. Depletion of this stock by converting it into man-made commodities (including man-made capital) will eventually reduce productivity and incomes as an imbalance emerges between man-made capital and natural resource capital. So neo-Malthusians are wary about the conversion process and argue that the production of more man-made capital at the expense of natural

resource capital is not necessarily a suitable bequest for future generations. At the very least, they wish to restrain the conversion process. They maintain that a cautious stance is required given the amount of natural resource conversion or substitution already completed. Thus, this group wishes to place strong conditions on the conversion process in order to achieve SD.

Human resource capital is a form of man-made capital, and all additions to human resource capital usually involve some use and transformation of natural resources. Hence, the sustainability of investment in human capital depends to some extent on the conservation of natural resources. Furthermore, one has to be careful to see that economic sustainability is maintained and not undermined by additions to HRC. The production of HRC is by no means a 'free lunch' from several different perspectives, even though it is often a worthwhile investment.

4. Sustaining and Adding to Human Resource Capital

The possibility of some conflict between the accumulation of HRC and SD has just been mentioned. Whether this possibility is likely to arise in practice is uncertain. Nevertheless, it is clear that an impoverished society finds it difficult to accumulate or sustain HRC. Failure to achieve SD could in the long term also make it difficult to sustain HRC because of impoverishment.

Human capital is a 'wasting' resource. The capital embodied in individuals is lost at their death and may be diminished prior to that or become obsolete. Every new generation needs to be invested in to sustain or to expand the stock of human capital present in the human population as a whole. This is so in relation to the knowledge and skills of a population as well as its physique and health. This is an expensive resource-consuming process. In many countries, expenditure on education and health are the largest items in the government's budget and private expenditure on these services further adds to the total outlay on these items.

Whether the information available to humans is human capital or not is a moot point. But it is potentially human knowledge and therefore potentially HRC. But sustaining information is not costless e.g. the maintenance of libraries, data banks and storage of information in the memory of

individuals and its transmission e.g. orally. In addition, information and skills can be (and have been) lost to human populations e.g. because skills are not passed on to succeeding generations. So knowledge once produced is not necessarily available forever. Investment is required continually to conserve it and transmit it.

The use of knowledge requires education. It involves transaction costs. From this point of view, knowledge is not a pure public good. Its mere supply does not make it available to all. Use of knowledge is a costly process. Without continual investment in education, knowledge is of little economic value. Continuing technological progress depends on adequate educational systems (Tisdell, 1981). However, these are necessary but not sufficient to ensure continuing technological progress.

Culture and the nature of market competition can have a significant influence on technological progress and innovation. But markets for scientific and technological knowledge are incomplete (Tisdell, 1996, Ch.17) and this means that as a rule governments have a role to play in the process of research and development. The incompleteness of markets in technology and intellectual knowledge results in new forms of industrial organization, such as the growing importance of multinational companies associated with the process of economic globalisation.

The likely impact of the present process of economic evolution on industrial structures and technological progress is uncertain, Schumpeter (1947) was of the view that large bureaucratic corporations could emerge under capitalism and stifle technological progress. There is also a possibility that economic globalisation will reduce business (and cultural) diversity, and that this could eventually slow technological progress (Tisdell, 1999b).

5. Some Relatively Direct Connections Between HRC and SD

It is difficult to specify a single simple formula which summarises the impact of humans on the Earth's biosphere. Daily and Ehrlich (1992), and other neo-Malthusians, suggest that (adverse) environmental impact of human activity is a function of the levels of human population, their natural resource use per head (affluence or a surrogate for this such as income per head), and the

technologies used for production. Technologies influence pollution emissions as well as the amount of resources used to produce a particular product. Thus the natural/environmental resource drain on the biosphere is

$$D = f(P, r, T)$$

where P represents the level of human population, r its resource-use per capita and T is technology ordered according to its increasing environmental impact. Therefore, reductions in P, r or T are favourable to sustainable development.

According to the neo-Malthusian viewpoint, economic activity is likely to be more sustainable the slower is the growth of population, the lower is the use of natural resources per capita and the less polluting or resource-wasteful is the technology used. Thus policies which restrain population growth, which encourage individuals to use or consume less natural resources per head and which encourage the use of technologies with low levels of pollution emission and natural resource use are favourable to sustainable development. Societies can reduce their use of resources per capita for given levels of production because of improved technologies or because of improvements in the efficiency of economic systems.

While GDP per capita is often used as an indicator of resource throughput, natural resource use varies according to the economic sectors comprising GDP. For example, some service sectors may be less natural resource-intensive than industrial sectors. If as a result of increased HRC, the composition of GDP alters in favour of service industries, this may enhance SD. However, we should take into account all backward economic linkages in arriving at an assessment.

In terms of the above neo-Malthusian formula, HRC can play a role in reducing population growth, and a role in other ways such as via changes in environmental values and awareness. Consider the population growth aspect first.

Becker (1981) suggested that the number of children in a family is largely a function of parent's demand for children and their cost of raising children. A fall in the demand of parents for children or an increase in the cost rearing them will, other things equal, reduce the size of the family. A variety of factors influence the demand of parents for children. In some societies,

demand rises with the contributions of children to family income and their value for providing economic security to their parents in their old age. These two factors may be of particular importance in developing countries, especially in rural areas.

It might also be noted that in societies where rates of mortality at a young age are high, the dependence of parents on their children for their economic security, particularly in their old age, may favour larger families to compensate for the risks of their children predeceasing their parents. Hence, improvements in health e.g. due to better nutrition and water quality and improved medical services, which increase expectations of human life, can result in parents having smaller families. Increased HRC is favourable to SD in this case.

If basic education becomes compulsory and if it is widely seen as a means of social advance, this feature of HRC may also reduce family size. Compulsory education would add to the cost of rearing children and their attendance at school can be expected to reduce their immediate contribution to family incomes. Interviews in rural India in January 2000 provided support for this hypothesis (see Tisdell and Roy, 2000). Thus on the basis of Becker's theory, this will favour families of smaller size. So might migration from rural to urban areas. Employment opportunities for young children are fewer in urban areas and the cost of accommodating and rearing children there are usually higher than in rural areas. As offspring tend to be more mobile in an urban setting and the power of parents over them is diminished so it becomes harder for parents to capture economic benefits from investment in their offspring. In general, urbanisation appears to favour families of smaller size and from this point of view is favourable to SD.

The gender distribution of HRC can influence SD. In some countries, females are deprived of HRC compared to males. They have less access to education, and often have less availability of food and medical services. This appears, for example, to be the usual situation in rural India (Tisdell, 2000; Tisdell and Roy, 2000). This can be unfavourable for SD for several reasons. Let us specify these.

There is evidence that the fertility of women declines as they receive more education (Murthi et al., 1998, pp.361-362; Caldwell, 1979, 1986, Subbarao and Raney, 1994). In addition,

appropriate education may assist women to reduce the rate of mortality of their children. However, probably more importantly, healthy and strong women as a consequence of better nutrition and medical services are likely to experience less infant mortality of their offspring. They should give birth to children with stronger chances of survival. Unfortunately, women in some societies are deprived of nutrition during pregnancy due to food superstitions, and the practice of males eating first and making leftovers available to the women and children, as is usual in the Indian subcontinent. Poverty itself, however, is the main reason for deprivation of pregnant females in many LDCs. Thus, the investment of more resources in HRC for females should contribute to a reduction in family size.

It should be observed that the welfare of children is highly dependent on the welfare of their mothers. A part of the HRC invested in women is transferred to their children by mothers. Usually deprivation of females results in deprivation of children. In some countries (such as India), improvements in the gender distribution of HRC will help promote SD.

One of the main reasons for gender imbalance in formation of HRC in rural India appears to be the view of parents that investment in the HRC of a daughter is lost to her immediate family on her marriage because she joins the family of the groom. By contrast, sons usually remain with their immediate family and their parents benefit from investment in their HRC (see Tisdell, 2000; Tisdell and Roy, 2000).

But even within Western countries, females had (and to some extent still do have) less education on average than males. Several factors may explain this. Mincer and Polacheck (1974) suggested that the return on the education of a female when the discounted present value of this investment is considered is usually less than for a male. Factors which could contribute to this include:

- loss of income of females during their child-rearing period
- ‘discrimination’ which results in a lower salary or poorer conditions of work for females than for males
- loss of skills and/or position in the seniority ladder during absence from work for child-rearing purposes.

While the gender-gap in education has tended to fall in more developed countries (MDCs), overall it still exists. However, it is possible that at present levels of education in MDCs, remaining gender gaps have little adverse influence on SD.

Furthermore, the role of women in production in many countries should not be overlooked. In Africa, they are often responsible for most agricultural production (World Bank, 1998) and contribute substantially to agriculture in most developing countries. Therefore, it is necessary to keep women informed of techniques, or new techniques, the use of which is environmentally beneficial. But it is not only the gender gap in education which has adverse impacts on productivity and sustainable development. Unequal access of females to basic assets and resources often constrains agricultural development and adds to poverty (Udry *et al.*, 1995; Saito, 1994; Tibaijuka, 1994). The difficulties faced by women in having a legal right to land or real assets in some countries reduces their access to capital and finance because of lack of collateral. According to the World Commission on Environment and Development (1987), poverty is frequently associated with inability to achieve sustainable development e.g. because it sometimes stimulates population growth, and resource conservation may be sacrificed by the poor to meet urgent immediate survival needs.

However, the situation amongst the poor varies. In some cases, lack of capital limits destruction of natural resources. For example, where the poor lack capital, they often have limited ability to clear forests unless the capital is supplied by the richer members of society (cf. Wibowo *et al.*, 1997).

Education can be used to strengthen environmental values and awareness generally and to promote knowledge of environmentally favourable techniques and methods. Thus, it can play a relatively direct role in promoting SD.

Education may also alter the type of commodities that individual demand. Educated individuals may be more inclined to demand service-type commodities rather than more material goods. Thus, as a result of more education, the composition of national production may change towards one involving reduced use of material inputs per unit of output. Despite this favourable

possibility, there does not seem to be clearly available evidence that the educated have a lower material consumption than the uneducated. In fact, levels of education and GDP per capita are positively correlated when national comparisons are made. This suggests that the type of education imparted may be of over-riding importance.

There is also a less savoury side to human existence which has some bearing on sustainable development, namely the occurrence of crime. The incidence of crime appears to be higher amongst those deprived of human resource capital, especially those deprived of education. Education is used in many goals as a rehabilitation measure because it is believed that those with greater education are less likely to re-offend. Crimes committed against persons can directly reduce their human resource capital and crimes involving property diminish the property rights of its owners. Crimes, therefore, add to cost of protection which is a drain on resources and reduces sustainability. Furthermore, insecure property rights are likely to reduce productive investment in property. Both systems of enforcing the law and punishing criminals add to economic costs and create an economic burden. The costs of law enforcement can be very high. For example, it was reported (Australian Broadcasting Commission, February, 2000) that the USA has over 2 million persons in goal, the highest incidence of imprisonment in the world, involving an extraordinary large annual cost. The majority of prisoners are from disadvantaged socio-economic groups – the investment in their human resource capital has been comparatively limited. The problem is partly (but not completely) a result of failure to meet basic needs and provide equality of opportunity for disadvantaged individuals and groups. It further illustrates the point that improved distribution of human resource capital may pay even in a narrow economic sense and improve global prospects of achieving sustainable development. From a social point of view, it is a folly to believe that one can safely concentrate on the total level of provision of human resource capital and ignore its distribution.

It can be seen that investment in HRC can have important positive effects from a neo-Malthusian view in helping attain SD. Furthermore, the distribution of HRC between females and males is especially significant as an influence on the sustainability of development.

While the significance of the interpersonal allocation of investment in human capital for the distribution of personal income was recognized early in the development of human capital theory (Mincer, 1958; Becker, 1975), less attention was given to how in practice this total investment could be misallocated from the point of view of maximizing (social) returns on the investment. Sources of such misallocation can include market failures and the prejudicial nature of entitlements (Sen, 1981; Tisdell, 2000a). Nevertheless, this aspect has not been completely ignored in the literature and has, in one way or another, been given considerable attention in relation to the economics of education (cf. Blaug, 1985).

Clearly investment in human capital is not the only determinant of national productivity and of personal income or productivity but it is a significant component. Personal returns from investment in education, for example, do not depend purely on its addition to the productivity of individuals but are also influenced by such factors as filtering and signaling, family connections and networks, and social prejudices (cf. Strober, 1990). The position is complex and dynamic. For example, affirmative action or preferential treatment in the allocation of investment in human capital to disadvantaged social groups may in the long run eliminate or reduce their social disadvantage allowing the preferential treatment to be withdrawn. But it is not possible to explore such complexities here.

6. Improved Global Use of Human Resource Capital

Not only is the gender distribution of HRC important for SD, but so too is its international distribution and its distribution between families. Given Becker's theory of the family and the above observations, impoverished parents, especially those with low HRC, are more likely to have larger families and may be less inclined to engage in activities supportive of SD. Hence, SD might be promoted globally by fostering a more even distribution of HRC.

In order to achieve this, higher income countries need to provide greater support to provision of HRC in developing countries. Many developing countries are unable to meet the basic needs of a significant proportion of their population from their available resources.

In some African countries, for example, and in some Pacific island nations e.g. Papua New Guinea and the Solomon Islands, basic universal education is far from being achieved and school enrolment rates are falling. Access to health services is extremely limited – significant proportions of the population have no access to modern health facilities. Nutritional and environmental health problems (such as malaria) continue to exert a heavy toll in these and several other least developed countries.

Although there has been less emphasis in recent times on the importance of meeting basic human needs as a development goal, the above argument suggests that the fulfilment of basic human needs is likely to promote SD. Aid donors should keep this in mind. Furthermore, fulfilment of this goal helps to promote equality of opportunity for children.

It has been argued (e.g. by a participant in a seminar at Rabindra Bharati University) that equality of opportunity is a difficult goal to achieve in LDCs. This is true. But it is probably so in all societies. Furthermore, the fact that perfect equality of opportunity cannot be achieved is not a reason for failing to try to achieve greater equality of opportunity. In fact, in many LDCs some progress has been made in that regard. For example, India has positive discrimination in public employment (reserved quotas for scheduled castes and scheduled tribals), required one-third female membership of local government bodies (panchayats) and other policy measures such as programmes for the development of women and children in rural areas (DWCRA).

Recent global policy emphasis has been on structural adjustment policies with user-pays being promoted as a means to regulate the supply of education and health services. Free food and nutrition supplements for needy children and the poor are being phased out in many countries. This, however, is likely to reduce the formation of HRC for the disadvantaged and have negative impacts on SD. A strong argument still exists for global society to try to ensure that the basic needs of all can be met.

Not only does attention need to be given to the global distribution of HRC, but methods should be explored to use human resource capital more efficiently and effectively. More developed countries can provide (and do supply) technical, educational and health services to least

developed ones under aid programmes. Valuable knowledge can be shared between nations. Exchange of information and knowledge should not be one way. Many developing countries have valuable and unique methods and knowledge. All interaction between individuals of different nations need to be a two-way process. Advice and services provided by higher income countries to lower income ones need to be appropriate to their requirements and culture.

Furthermore, research and development must continue in order to find lower cost methods of providing HRC and to discover new methods of sustaining and developing HRC. In addition, reductions in economic X-inefficiency and improvements in economic allocative efficiency in the provision of human capital can ensure that the world's limited resources for investment in human capital are more productive. Appropriate techniques for bringing this about will vary but performance budgeting and cost-benefit analysis do have a role to play.

7. Concluding Comments

Figure 1 summarises ways in which increased human resource capital and improvements in the distribution of access to it (for instance by ability, gender, social status and internationally) can increase the prospects of achieving sustainable development. In many cases, improved distribution of human resource capital can make a greater contribution to the prospects of achieving sustainable development than policies designed to increase human resource capital which fail to pay attention to the social distribution of that capital. Economic policies which fail to address distributional issues, and which ignore the inability of large sections of the population to meet their basic needs normally have adverse consequences for the allocation of human resource capital and are usually inimical to sustainable development.

INSERT FIGURE 1

Human resource capital has an important role to play in sustainable development. This is not only because increases in HRC can have a positive impact on technological progress but also can play a positive role in restraining increases in human population. Furthermore, education can promote a positive attitude towards conservation and increase awareness of environmentally

friendly choices or alternatives. Nevertheless, we must be aware that investment in HRC is natural resource-consuming. It may, therefore, need to be adjusted or moderated taking into account its use of natural resources. Measures which globally increase the efficiency of investment in human capital can be natural resource-saving, and should therefore be sought and promoted.

Globally there has been a retreat from the basic needs approach to development policy. Emphasis has shifted to market-dominated development, with small government having little involvement in the economy and placing emphasis on user-pays for education and health. There has been a significant retreat from the welfare state (Tisdell, 2000).

Such an approach has an adverse impact on the distribution of HRC and overall is likely to reduce total investment in HRC. Not only do such policies reduce equality of opportunity for children but for reasons outlined above, may in the long-term have adverse consequences for SD. Note that equality of opportunity is not the only social or distributional goal worth pursuing where equality of opportunity is taken to imply equal resource availability (such as educational resources) for individuals of equal ability.

Equality of opportunity has both equity and economic efficiency implications. In order to maximise returns from investment in human capital, investment in this capital should be allocated to equalize the marginal return from its investment in each individual (Tisdell, 1982, pp. 448-459). As a result, those with superior abilities are likely to earn higher incomes or rents. Thus some inequality of income may be promoted by favouring the gifted.

On the other hand, this higher income will normally result in those benefiting from this extra benefit paying higher taxation, some of which may be redistributed to the handicapped. In accordance with Rawlsian principles (Rawls, 1975), some consideration should be given to the handicapped in redistributing income. But inequality in resource allocation (and up to a point, income) to gifted individuals may benefit all.

On the other hand, the provision of human capital to individuals should not turn purely on economic efficiency principles, if account is taken of Rawl's principle of justice. This principle may be used to support the provision of at least basic education, health facilities and so on for all. However, equality of provision of education and compensatory equality in the provision of education seems difficult to justify, even using the principles of Rawls (1975).

A moral case can be made out for the provision of basic investment in human capital for all, and sustainability aspects mentioned in this article strengthen that case. The matter is complex and compromise solution seems to be socially optimal. Particular caution is required in applying market mechanisms to the provision of health and educational services. From a HRC viewpoint, it is also a worthy goal to ensure that the basic needs of all for food, water and shelter are met. Otherwise children are inevitably disadvantaged and deficiencies occur in the formation of HRC as a result of these disadvantages. These have negative consequences for SD.

A social approach should not be entirely rejected in favour of a market-led approach to development. To do so is to ignore important questions of social justice and to compromise the sustainability of development. There are non-market schemes which can promote equality of opportunity and increase economic efficiency and sustainability without creating burdens from income redistribution. These include government financed loan schemes for education such as those operating in Australia for higher education. These provide a non-market means of providing extra educational resources to those able to benefit from these. The repayment of these loans depends on levels of future income of the recipient. Therefore, they do not unduly burden the recipient or create a high-risk burden for the recipient. They also ensure that any distribution of income in favour of the gifted is moderated to a greater extent than is likely to occur through the usual taxation system.

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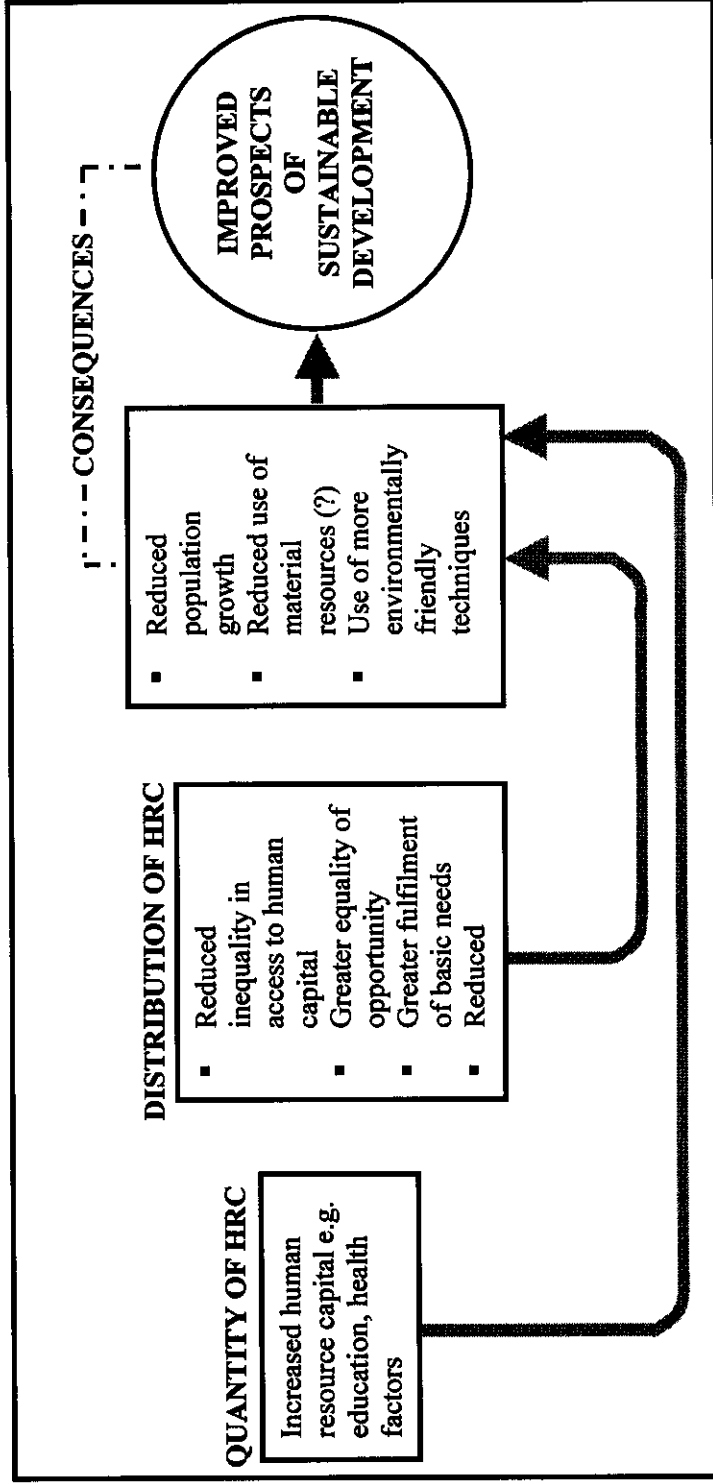


Figure 1: Diagrammatic representation of favourable relationships between human resource capital and sustainable development.

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