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# **ECONOMICS, ECOLOGY AND THE ENVIRONMENT**

**Working Paper No. 141**

**Poverty, Policy Reforms for Resource-use and  
Economic Efficiency: Neglected Issues**

**by**

**Clem Tisdell**

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EFFICIENCY: NEGLECTED ISSUES**

**by**

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# **Poverty, Policy Reforms for Resource-use and Economic Efficiency: Neglected Issues**

## **Abstract**

It is widely believed that in developing countries, open-access to natural resources, inadequate private property rights, and lack of development of market systems adds to the incidence of poverty. Increased economic efficiency is seen as a powerful force for reducing the extent of poverty in developing countries in the *long run*. While this may be so, it ignores the depth and incidence of poverty that can be generated during adjustments to policy reforms. This possibility constrains policy choices as is shown theoretically for natural resource policies and for agricultural adjustment policies giving Asian examples. Social, behavioral and institutional features are also considered that may result in poverty lock-in of some groups. It is essential to consider dynamic processes and not to rely solely on comparative statics when assessing economic policies to reduce poverty and increase economic efficiency. It is also important to take into account institutional constraints on policy choices.

**Keywords:** Adjustment to policy change; agricultural policy; Asia; economic efficiencies; institutionalism; market reforms; natural resource policies; poverty.

# **Poverty, Policy Reforms for Resource-use and Economic Efficiency: Neglected Issues**

## **1. Introduction**

Open-access to natural resources, lack of establishment of private property rights, and insufficient extension of market systems in developing countries are often seen by economists as features that contribute to economic inefficiency and which add to the incidence of poverty in such countries, as for example pointed out by Dasgupta, 1993, Ch.6. Consequently, it is often recommended that access to and use of shared natural resources be subject to (improved) government regulation and/or that private property rights in resources be more widely established, and that competitive market systems be extended. While this view might have some long-run merit, the theories underpinning it are based on comparative statics and assume a society in which individuals are perfectly mobile. Hence, these proposals usually ignore the dynamics of adjustment and overlook barriers to policy implementation, such as initial increases in the incidence and depth of poverty before such policies become effective. The purpose of this article is to bring attention to such issues and consider their implications for public policies intended to increase economic efficiency and reduce the incidence of poverty.

First, policy barriers (arising from initial increases in the incidence and depth of poverty and income reduction) to raising the economic efficiency of using shared natural resources in developing countries are discussed. This is particularly relevant to open-access resources. Then limits to the private property solution are explored. In some circumstances, creation of private property is not efficient and can add to the occurrence of poverty. Subsequently, the difficulties which poor rural landholders and users of common resources face in adjusting to the extension of the market system are considered. Institutional and behavioral factors that may lock some social groups into poverty are also explored.

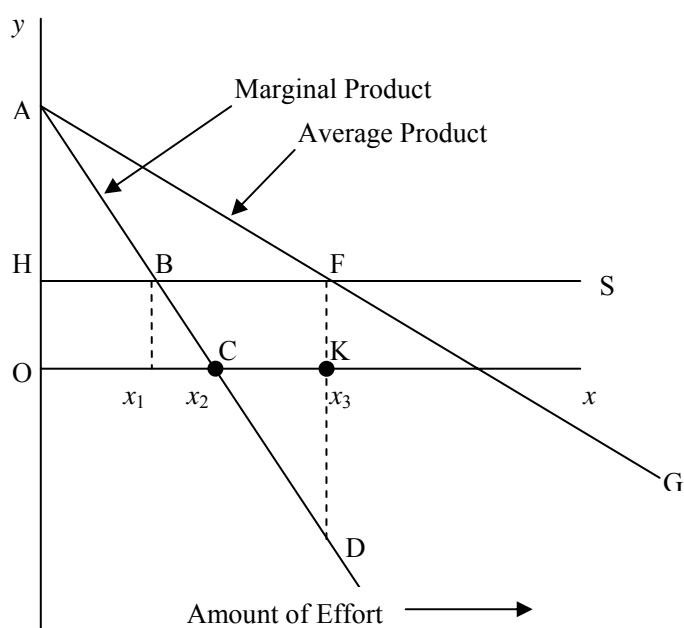
Note that an economy will be regarded as achieving economic efficiency when it satisfies the conditions for a Pareto optimum. A change that results in Kaldor-Hicks

improvement (a potential Paretian improvement) is viewed here as being one that increases economic efficiency.

## **2. Poverty and Income Barriers to Efficient use of Shared Natural Resources**

The purpose of this section is to show how developing countries often get locked into the excessive use of natural resources. It shows that once overexploitation of the natural resources occurs, policies to increase economic efficiency of resource-use are usually socially unacceptable because they initially cause too much economic suffering to those they are intended to help. Then reasons are considered why governments permit over exploitation of natural resources to develop.

The problem can be illustrated by using a simple diagram commonly used to show how open-access to a renewable resource leads to economic inefficiency (Gordon 1954, Tisdell 2005, Ch.6) and by modifying the exposition to fit the type of situation likely to arise in developing countries. This is shown in Figure 1 and may apply, for example, to the harvest of fish, forest resources, utilization of shared pastures and similar biological resources. On the X-axis, the number of units of effort ( $x$ ) employed in utilizing the natural resource are shown and on the Y-axis, units of output are indicated. Units of effort might be measured by the number of persons using the resource by working a standard number of hours with a standard bundle of complementary materials. Assume this interpretation.



**Figure 1.** Diagram used to illustrate the poverty trap problem arising from open-access to a biological natural resource.

In Figure 1, the line marked HS is assumed to represent the supply of effort, the line marked ABD is the long-term marginal product of the effort and the line AFG is the corresponding average product. The latter are long-term production relationships because they are based on the long-term population dynamics of ecological systems.

Given open-access and the supply curve HS, long-term equilibrium will be established at point F. If line HS represents the marginal opportunity cost of effort expended in utilizing the shared resource, this result is economically inefficient. In this case, a potential Paretian improvement is possible in the long-term by reducing effort in utilizing the shared natural resource from  $x_3$  to  $x_1$ . But in developing countries, the supply curve of effort in exploiting the material resources may not represent the opportunity cost of the variable inputs if used elsewhere. These could be lower than OH in Figure 1 if, for example, HS corresponds to a subsistence level of income. Those employed in exploiting the natural resources may not have much economic value elsewhere in the economy and there may be barriers, such as transaction costs, involved in their movement.



Given the lack of mobility of rural dwellers, policies to improve long-term efficiency and raise incomes of those dependent on the natural resource can have disastrous consequences in the short-term. This term may not be all that short, as pointed out by Keynes (1936). For example, given the initial equilibrium at F, a policy to shift this equilibrium to B will *initially* leave the biomass and other features of biological natural resource unchanged. If each person utilizing the resource is required to reduce their effort by  $(x_3 - x_1)/x_3$ , the income of each falls immediately by this proportion because initially the output/effort ratio remains constant. Income levels could, therefore, fall initially below the subsistence level. How rapidly incomes per head subsequently rise depends on the speed of recovery of the biomass of the biological resource following the reduction in its intensity of use. This will vary depending on the type of biological resource involved. In the case of k-selected biological resources, that is ones with a slow reproduction rate, the rate of recovery in income will be slow; moving from F to B will be a slow process. The length of income deprivation would be much longer when k-selected species are involved than in the case of r-selected species, that is species with a rapid reproduction rate.

An alternative to reducing the effort of all persons exploiting the natural resource would be to exclude some completely from its exploitation. In this case, those contributing  $x_3 - x_1$  of effort could be excluded. However, those excluded may have few if any other economic alternatives and may be unable to survive. Therefore, this policy is unlikely to be socially acceptable.

In many Asian countries, fishing effort exceeds that consistent with maximum economic yield and fish stocks continue to decline. This is true, for example, for Thailand and seems to be so for many of the artisanal fisheries of Indonesia. The Thai government attempted to enforce local fishing restrictions to increase fish yields in the long-term, for example, the maximum size of mesh in nets was increased. This led to protests by fishermen who, amongst other things, kept their children away from school. The government was forced to back down. Again, the Indonesian government recognizes that many of its artisanal fisheries are over exploited. However, it does not take action to reduce fish catches because its artisanal fishermen are already poor and will suffer severely in the adjustment process. One suspects that this is also true in the Philippines and many other developing countries.

Given the lack of mobility of rural labour, a policy of trying to maximize the sustainable yield (MSY) from the biological resource rather than the economic yield (MEY) might be considered. In Figure 1 this would require reducing effort from  $x_3$  to  $x_2$ . In the long term, this would generate an increase in output equal to the area of triangle CDK. However, the problem still remains that per capita incomes will at first be depressed by restricting effort. If per capita incomes are already low, no leeway exists for doing this. If incomes are somewhat higher, there is leeway to do this but the policy may be unpopular.

Those having open-access to natural resources also fail to take into account user costs in their decision-making and this can result in unsustainable use of the resource. Once over-exploitation of the resources has developed, public policies to deal with the problem can face similar difficulties to those outlined in the previous case. For instance, consider a water aquifer from which water is being drawn at a faster rate than its rate of recharge. This is a well known open-access case (see for example, Dasgupta, 2001, p.108). Water reserves may allow excess use to occur for a time but eventually this rate of use will not be sustainable and the lowering of the level of the aquifer will add to the cost of the water supply. However, if incomes of farmers using the water are already low, government measures to reduce their water use will depress their income further. They will be unpopular even though they are rational efficiency measures because they bring use and recharge into balance, and may restore the level of the aquifer. If the rate of use is initially determined so that it is somewhat less than the rate of recharge, the original level of the aquifer will be eventually restored and water extraction costs reduced. A government may, however, have a reduced political support if it intervenes.

There are many examples of government failure in relation to the utilization of aquifers in Asia. A well known case is that in Taiwan. There underground water was continuously used without restrictions for aquaculture and irrigation. This resulted in falling water tables, land subsidence, and in some cases, saltwater intrusion into the aquifers due to lack of government action.

Similar problems arise in relation to use of several inland water bodies in Asia. In many cases, water use exceeds the inflow of new water. The off-take of water from rivers and streams feeding these bodies is so large that their levels fall and adverse economic externalities occur. This happened to Dong Ting Lake in Northern Hunan Province, China. This lake is China's second largest freshwater lake. Serious problems have also arisen from the use of water supplying the Aral Sea, the level of which is falling. The latter problem is made worse by the fact that this freshwater sea is a resource shared by several countries and the rivers feeding it flow through several nations: transboundary problems exist. Some interesting background on the ecological fate of the Aral Sea is available in Wikipedia ([http://en.wikipedia.org/wiki/Aral\\_Sea](http://en.wikipedia.org/wiki/Aral_Sea)). However, even in cases where transboundary problems are not present, it seems that governments fail to act or are tardy in regulating the use of shared natural resources. Once these resources become over exploited, developing countries are unable to implement policies to extricate those on low incomes from their economic predicament.

Why do governments allow the above problems to develop? One explanation is that government policies are often reactive rather than proactive. Initially as the exploitation of an open-access resource progresses, there is no apparent economic problem: above normal incomes may be earned and no threat to the sustainability of the resource is apparent. The decline in incomes may be gradual. By the time problems become pressing, the incomes of those exploiting the resource are likely to have fallen to low levels. A government in a developing country then has little leeway (as was illustrated above) to deal with the problem if those dependent of the use of the natural resource have a low level of mobility in the economy.

### **3. Private Property as a Solution to Inefficient Resource Use and/or a Means to Reduce Poverty.**

The creation of private property rights in resources such as land, is often seen as a means to increase economic efficiency and to reduce the extent of poverty, at least in the longer term. This is a possibility. Some writers (e.g. North and Thomas, 1976, North, 1990) associate the creation of private property rights with economic development and with improvements in economic performance. However, it is not

always economic or practical to establish private property rights for all natural resources, for example, in mobile wild fish species.

Furthermore, the establishment of private property rights can initially create considerable economic hardship in situations in which open-access has previously prevailed. For example, if there is open-access and the situation shown in Figure 1 prevails with equilibrium at F, creation of private property rights is likely to result in initial economic hardship. Some of those using the natural resource are likely to be excluded from its use and may have few, if any, economic alternatives in less developed countries. If the owners of the resource are landlords, it is even possible that the lot of those utilizing the resource does not improve after the creation of private property. After the extraction of rent by the owners of the natural resource, the income of those directly employed in exploiting it may remain at subsistence level in the new equilibrium. Depending on social and institutional factors, the landlords may fail to invest their rent in a manner that promotes economic development. So in some institutional circumstances, the private property solution may be no better (or even worse) than on open-access one from an economic point of view.

Dasgupta (1997, p.17) summarises the distributional consequences of privatisation of the village commons as follows: “Many of the studies suggest that privatisation of village commons and forest land, while hallowed at the altar of economic efficiency, can have disastrous distributional consequences, disenfranchising entire classes of people. The point is a simple one: unless an appropriate fraction of the rents earned from the resource base subsequent to privatization are given to customary users, they become worse off”.

Attention was originally brought to this problem by Weitzman (1974). He argued that under private ownership of a previously open-access resource, former common-property users working as wage-earners for private owners of the resource have a reduced level of aggregate income. His argument is based on comparative statics and is similar to that given above in discussing Figure 1.

In some cases, also the creation of private property in natural resources, such as land, may generate adverse environmental spillovers, create new sustainability problems or

be the result of misguided public policies. On occasions, use of privately owned land, for instance, generates negative environmental externalities (Dasgupta, 2001, Ch.7). This can result in increased overall economic scarcity. Furthermore, private ownership does not ensure sustainable resource uses. If the private rate of return from use of the resource is less than the prevailing rate of interest, there will be a private incentive to liquidate the resource (Clark, 1976).

When the creation of private property rights becomes a political mantra, situations can occur in which the creation of private property rights adds to economic scarcity and the extent of poverty. For example, suppose a geographical area used initially for the shared grazing of livestock. However, a portion of it is suitable for the growing of crops using irrigation. Suppose that the government decides to convert this land into private property which is to be used for crop growing. The graziers are excluded from this land and their access to water for their livestock may become difficult. The degree of impoverishment of the graziers may consequently increase and the net value of production from the geographical area could fall. Developments of this type are said to have occurred in parts of Africa.

Sometimes, also governments promote agricultural development and provide land rights to settlers in regions where this is completely uneconomic and agriculture is not sustainable. Examples of this include some components of Indonesian transmigration programme. For instance, farmers have been settled on drained areas of former peat bogs in Kalimantan and allocated land rights. But such areas are unable to sustain agricultural production and the utilization of the land for agriculture results in many serious adverse environmental externalities (Singleton et al., 2004, p.170). These include increased frequency of forest fires, peat fires which are extremely difficult to extinguish (all of which adds to smoke pollution, a serious problem in Southeast Asia and result in increased greenhouse gas emissions), collapse of surrounding forests due to falling water tables, and loss of biodiversity. In the long-term, those families settled in such areas are liable sink into poverty as the land on which they are settled is unable to sustain its agricultural productivity.

#### **4. Market Extension and Poverty Generation in Rural Areas**

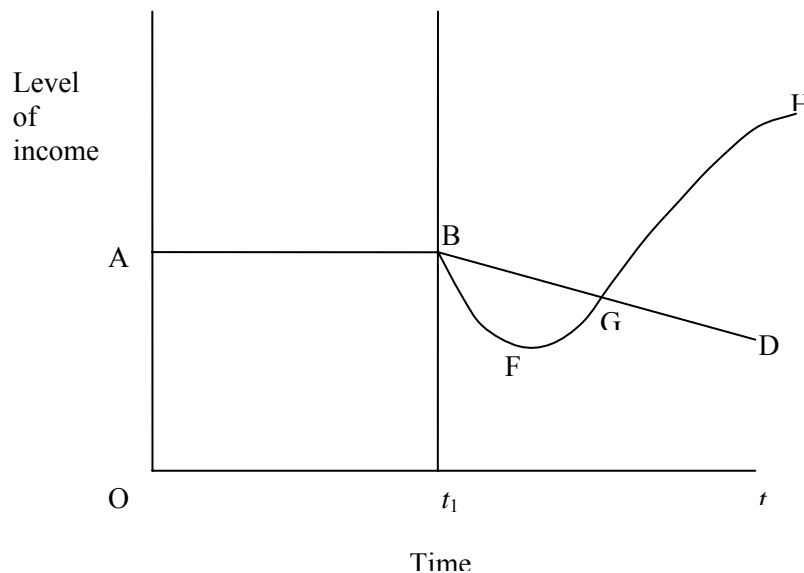
Market extension is often suggested as an effective means of reducing the incidence and depth of poverty in developing countries (World Bank, 1986). While this may be so in the long run, extension of and transition to market systems in rural areas may initially be associated with a rise in the incidence and severity of rural poverty. In assessing this possibility, at least three factors need to be taken into account: (1) adjustments to market systems usually involve learning, uncertainty and investment; (2) common access to shared resources is likely to be curtailed with possible adverse economic consequences for the poor; and (3) migration to find alternative employment may be a greater economic problem for the poor than those who are better off. Let us consider each of these factors in turn.

##### *Adjustment to market systems involve learning, uncertainty and investment*

For those not familiar with market systems, the introduction or extension of market systems involves considerable cultural adjustment and usually on alteration in social values. Apart from this, market systems result in considerable changes in the economic use of resources as time passes. Farmers, for example, may find that types of crops or other land use which were once economic are no longer economic (or are much less so than alternatives) once market systems are introduced or extended. This can be a problem for the poor because switching of land use generally requires investment and some extra risk or uncertainty. In addition, a period of learning by doing may be involved. During this period, the costs of those switching land uses may be above those in the industry and their returns lower. In the early learning period those trying new land uses (that may eventually be more profitable) may suffer losses.

Theoretically, the issue can be illustrated by Figure 2. Suppose initially that there is an established land use that gives a farmer an income of OA but at  $t_1$  market conditions change so that without a change in land use the existing land use results in falling farm income represented by line BD. However, an alternative land use is available which in due course results in a higher income. If this alternative is pursued at  $t_1$ , the trajectory of income is BFGH. At first, income falls below BGD because of initial learning requirements. This income-sacrifice involved in switching is a type of investment. In addition, new investment in physical capital may be required. This may

initially result in a significant fall in cash flow below B (not shown) if the investment is self financed.



**Figure 2.** Alternative income consequences for a farmer of adjustment to market change and non-adjustment to market change.

Poorer farmers in a rural community may be unable to adjust or able to adjust only imperfectly to significant market changes (Tisdell, 2003). They may not have access to credit or accumulated funds for investment in facilities to bring about changes in land use. Furthermore, they may not be able to cope with the fall in income and uncertainty that arises during the adjustment period. The poor may, therefore, continue with their initial land-use practices. Consequently, their income falls and their degree of impoverishment rises. As a result, as time passes, the poor become trapped. Their economic scope for switching land-use patterns diminishes and they are likely to be forced eventually to abandon their land which may be acquired by richer farmers.

These patterns are consistent with, for example, the observation of Mordoch (1993) that poor farmers were tardy in adopting hybrid seed in India compared to richer farmers (see also Duflo, 2006, p.372). However, this is not necessarily because they are more risk averse. They do in fact have less credit available, and less savings, lower incomes and are more vulnerable than the rich. For the poor, market adjustment

is a major problem and is likely when markets are significantly extended to cause them distress. As Bardhan and Udry (1999, p.62) point out, in developing countries “land [usually] passes from distressed small farmers to landlords and money-lenders”.

With China’s entry into the WTO, there were concerns in China that agriculturalists in China’s Northeast region might have to make substantial economic adjustment because of their reliance on soya beans and maize for income (Tisdell, 2003a). It was thought that these poor farmers might have to switch to alternative crops with which they were unfamiliar because of possible US exports to China. This raised the type of potential adjustment problems outlined above using Figure 2.

#### *Exclusion from use of shared resources*

As the market system develops, the poor may be increasingly excluded from the use of shared natural resources. It may happen that these resources increasingly become private property (for example, as a result of land enclosures) or become state property (for example, assertion by the state of rights in natural forests and the state in turn may give concessions to individuals and companies for the exclusive exploitation of these). Several authors (for example, North and Thomas, 1976; North, 1990) have suggested that with economic development and the extension of market systems that private property regimes become more pervasive.

In this process, it is likely that the richer numbers of society gain natural resources whereas the poorer members experience a net loss of use of natural resources (see for example, Bardhan and Udry, 1999, Ch.13). The richer numbers of society are usually better educated and have wider and more effective social networks. This helps them to acquire common property resources as their private property. In some cases, the poor have no legal titles to their land – only customary use. This is, for instance, true of some tribals in India. In a legalistic system, the poor can be dispossessed. Consequently, in rural areas, the poor may become relatively less well off and struggle to gain subsistence.

There is no doubt that the relative economic dependence of the poor on common access resources in developing countries is high, as is pointed out by Dasgupta (1997, Pp. 10-11). Apart from the empirical evidence referenced by Dasgupta, Alauddin and



Tisdell (1988, pp.118-124) summarise empirical evidence obtained in rural villages in West Bengal and Bangladesh which suggests that the poorest members of the villages suffer most economic disadvantage as a result of losing access to natural resources as economic development occurs.

#### *Migration and the poor*

The deteriorating economic situation of the poor in rural areas may force them to consider migrating to urban areas to search for better economic alternatives. However, migration is not a costless process and it is not without economic risks for migrants. The rural poor are least able to cope with these costs and risks. This is because the richer members of the rural community are likely to have some savings to help finance the migration of family members, have wider social networks than the poor, are better educated and are more aware of urban opportunities. Thus, the rural poor seem to be especially disadvantaged in coping with market adjustment if it involves new migration patterns.

Lipton (1977) argued that the poor find it more difficult to be geographically mobile than those who are better off. One of the reasons for this is the relatively high level of transaction costs involved in geographic mobility (Bardhan and Udry, 1999; Carrington et al., 1996). Regmi and Tisdell (2003) found evidence to support Lipton's hypothesis. They suggest that the richer members of rural communities were more proactive in their decision-making than the poor who may be more reactive, and argued that this helps to explain observed rural to urban migration patterns in developing countries. This strongly suggests that there is considerable scope for applying behavioral economics to the study of the poor (Mullainathan, 2006).

### **5. Social, Institutional and Behavioral Aspects of Poverty and Economic Adjustment.**

Social, institutional and behavioral factors influence the prospects for reducing poverty and the dynamics of its reduction. Consider in turn the importance of social networks, institutional/cultural lock-in of poor communities and learnt behaviors as possible impediments to the reduction of the occurrence of poverty.

### *Social Networks*

In some societies, the poor are excluded or almost excluded from social networks which play an important role in providing information about economic opportunities. For example, members of Scheduled Castes and Scheduled Tribes in India may have more limited networks than Indians not in these groups. Furthermore, their poverty often persists because of their social exclusion from occupations that could enhance their income prospects (Ramanjaneyulu, in press). In addition, their lack of contact with individuals with economic and political influence is likely to mean that they have a weak bargaining position in resource-use disputes.

Again the poor generally have a low level of education and this further reduces their access to information and their ability to defend their economic position. In some cases, social networks provide members of the social network with economic rents. Members may be keen to limit the size of network so their rents are not diminished or do not disappear. Up to a point, a social network may be akin to a club. The per unit benefits to members may be of a reversed-U shaped form as a function of the number of members in the network. Furthermore, the network needs to consider the 'qualities' of potential members in terms of the benefits they may bring to the network before including them in the network. When social networks consist mainly of richer members of society, they may believe that additions of the poor will diminish the quality and value of the network.

### *Institutional/cultural lock-in*

Some social groups become locked into poverty because of strong cultural bonds and social networks within their communities. Their local networks often involve social reciprocity and this can be a means of economic insurance (Dasgupta, 1993, pp.208-212). This seems to be true of some tribal groups (such as some Australian Aborigines) living in remote regions where economic opportunities are few. But this phenomenon is not limited to Australia. It applies to many tribal groups or ethnic minorities in the Asian-Pacific and in other parts of the world.

The importance of the personalized nature of many transactions in rural communities has been emphasized by Dasgupta (1993, p.141). He also points out the significance of culture as an influence on behaviors. The horizons of tribal and similar traditional

groups and rural communities may be confined largely to their own community. They might not, for instance, put a high store on formal education since it leads to little or no economic improvement in their situation in their own community, and migration to join outside communities may be viewed as a remote possibility. In a way, the existing social isolation of such groups furthers their continuing isolation and hampers the extension of their social networks.

In addition, if a poverty-ridden social group is easily identifiable, its members may face economic discrimination by other communities. Given limited knowledge of the economic abilities of individuals from this group, they may be judged by other communities in an imperfect world by their imagined average performance or by a stereotype. Such discrimination is likely to act as a deterrent to individuals from a poverty-stricken group seeking economic opportunities outside of their group. This also reduces their returns from acquiring skills which potentially have economic value outside the group. Therefore, rationally their incentives for such acquisition of skills and education are weakened.

#### *Behavioral path-dependence*

Most communities transmit to their offspring skills and information that are likely to assist them in earning their livelihood. This transmission may be supported by customs and codes and hierarchies (compare Max Weber as translated by Parsons, 1947). As a result, a community may become locked into a particular way of life. The community may not display any economic development and may experience an increase in its relative poverty compared to the wider community. In certain circumstances (for example, growing environmental degradation) its living standards may fall and absolute poverty may become widespread.

It has been said, for example, that in many cases, the Bedouin have become locked into a particular lifestyle involving migration and grazing. Consequently poverty amongst the Bedouin has become pronounced. When such groups in Iran have been asked to change their utilization of rangelands or their occupations, they are reported to rangeland regulators that this is the only way of life they know and that it has been handed down by their forefathers (personal communication Kamran Zendhdel, February, 2007). They prefer the status quo (the life they know, despite its hardships)

and they wish to continue it in deference to their ancestors (an inheritance factor). In such circumstances, it is very difficult to implement reforms that may reduce the extent of poverty experienced by such groups. See also Tisdell (2003b).

## **6. Concluding Comments**

More attention needs to be paid to the dynamics of policies intended to alleviate poverty and to the trajectories of adjustment processes. This has been illustrated in the case of policies designed to reduce the incidence of poverty arising from the over exploitation of shared natural resources, by identifying difficulties that can arise for the poor when private property regimes are extended and market systems become more pervasive. Social, institutional/cultural and behavioral factors have also been highlighted that interfere with patterns of economic adjustment and create difficulties for poverty alleviation within some social groups. All such impediments to the process (dynamics) of poverty alleviation need to be considered. The trajectories of economic policies are just as important as their final or equilibrium consequences. In fact, they are probably more important.

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