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**An Overview of Some of the Policy Implications of the Eco-Economic Development Market**

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**Key Words** Development Paradigms, Economic Development, Eco-Economic Development, Paradigm Mergers, Forest Areas, Deforested Areas, Land Conversion, Land Reversion.

The recent economic/environmental discourse on development issues has led to a new paradigm of development called here the eco-economic development model, but usually known as sustainable development(include both ecological and economic concerns), which has successfully substituted the traditional model of economic development in general acceptance. However, new models usually imply new rules and perhaps a new type of market. Yet, policy issues within the eco-economic development paradigm are being addressed with theoretical constructs and a state of mind as if we were still in the old paradigm. Part of the reason for this may be that the nature and the internal structure of the new paradigm are not yet well-known and understood as nobody has apparently looked into this. It should be expected that the two paradigms are not equivalent to each other, and therefore, they should be addressed differently. The goal of this paper is to present a qualitative approach from a systematic point of view which can be used to highlight how different the two paradigms are in terms of structure and policy implications. Then, this information is used to provide an answer to three of the most important questions related to the issues mentioned above: is the economic development market the same as the eco-economic development market?; if not, how many invisible hands are there in the eco-economic development market?; and what are the environmental, social, and economic policy implications of this situation?. Over all, it is shown that new paradigms require a new line of thinking to market policy and planning.

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## **Introduction**

A paradigm shift has taken place since the report of the Bruntland Commission was released in 1987. The traditional economic model of development no longer dominates development planning and decision making, both in developed and developing countries. A new, not yet well understood model of development is now in its place. The general goal of this paper is to present a qualitative tool that can be used to identify the characteristics and nature of these two different models of development as well as to point out differences in terms of their social, economic, and environmental policy implications.

### **i. Background**

Two of the main implications of the findings published in *Our Common Future* (WCED, 1987) are: that the traditional model of economic development based only on economic incentives was not sustainable; and that in order to be sustainable, development has to balance economic, social, and environmental concerns.

Soon after these findings were out, two dynamic processes took place. One dynamic process refers to the environmental-social discourse which led to a situation where environmental concerns dominated over social concerns. In other words, processes of environmental degradation appear to be considered of higher relevance than processes of poverty and social degradation. Consistent with this dominant role of environmental concerns, humans are the central concern for sustainable development (Elliott, 1998), and poverty is recognised as a major source of environmental deterioration and an impediment to sustainable development (Elliott, 1998). Therefore, social actors appear to have ended up as the driving forces behind global/local environmental degradation while environmental concerns and initiatives are on the increase. For example, environmental commitments and agreements are increasing at the international level (GOFC, 1998). On the other hand, social goals/incentives are usually not reflected directly in environmental programs. For example, Canada's Green Plan does not include social goals/incentives, and Canada's Sustainability Goals do not list poverty elimination as a goal as it can be seen in the list of Sustainability Goals provided in Sadler (1996). Robinson *et al.* (1996) describes how social life in the year 2030 will be in Canada, yet no direct mention is made on how small or large the levels of poverty will be. This is consistent with Taylor's 1994 observation that the two dominant and contradictory paradigms, expansionist and ecological paradigms, do not place a direct link to poverty.

The other dynamic process refers to the environmental-economic discourse, which led to the marginalization of extreme development positions by the promotion of a model of development in which economic and environmental concerns are balanced in compatible ways. This discourse

pointed to the formulation of economic and ecological strategies as the basis for a new paradigm of development, that is called here, eco-economic development. Others researchers and professionals traditionally call this new paradigm sustainable development. For example, Roome(1998) indicates that sustainable development is located in the continuum between two paradigms, technocentric and ecocentric paradigms. Notice that what is defined here as eco-economic development is not the same as 'Eco-Development' since eco-development had a connotation and use usually related to local level conditions and resources only, and eco-development is not based on the notion of a partnership between businessman and environmental groups. For example, Daugherty *et al.*(1979) defines eco-development as a process of transforming the environment in creative ways with the help of ecologically friendly techniques developed to fit this environment's potential. Eco-Economic Development, on the other hand, is the current effort to balance economic and environmental concerns based on the concept of partnerships that can have global or local applications.

From 1987 and on the traditional notion of the economic development model that the environment and society were merely inputs in the production process; that only the economy and its growth matters; and that environmental and social externalities associated with the market of goods and services were zero or minimal were challenged on environmental and social sustainability grounds. The binding nature of environmental constraints was then recognised and the harmful nature of environmental and social externalities more closely studied and assessed. When economic stakeholders benefit and society shares in or bears the cost there is a tragedy(Baden and Noonan, 1998; Hardin, 1998). Some believe that this tragedy can be solved by economic and environmental cooperation and others disagree on poverty/equity grounds. For example, some favour the vision of a sustainable industry approach(Roome, 1998) and others a vision of ecologically sustainable economic globalization(Gladwin, 1998) as a way of reaching economic and environmental goals. However, this approach may leave social poverty and equity issues unresolved. The sustainability problem arises because of the nexus between economic life and nature(Common, 1995); because rapid economic growth has not led to higher incomes for labour, better health care systems, more and better housing, less poverty or a society based more on democratic or egalitarian principles(Jaffee, 1998); and because the benefits of growth are not equitably or fairly allocated(Elliott, 1998).

## **ii. The need for compromise**

However, despite disagreements in this and other development areas, there is agreement that today's development path embraced by humanity is not sustainable(INCA, 1997). Maser *et al.*(1998) indicates that economy sustainability is dependent on environmental sustainability-not the other way around. Hence, there is more and more inclination to accept that there are environmental limits to growth. Daly(1997) indicates that the acceptance that the economy is a subsystem of the

environmental system implies that there are environmental limits, which is a view supported by ecological economists(Meyer, 1998).

Then, the idea of a partnership between economic agents(capitalists) and environmental agents(environmentalists) took ground based on a new way of environmental awareness and re-evaluation leading to the a new environmentally friendly economic rhetoric. Murphy and Bendell(1997) describe sustainable development as a partnership between the economic and the environmental community. The partnership of environment and the economy is based on the assumption that win-win solutions exist and can be implemented, and that society will act as required to achieve those goals. Finding win-win solutions means that the solutions must be economically viable. Serageldin and Sfier-Younis(1995) indicated that environmentally sustainable development must make sense in monetary terms.

The collusion of economic and environmental concerns to form this new model of development(eco-economic model) should not be a surprise given that an ongoing economic/environmental discourse could have had very negative effects on these two groups of stakeholders in the long run. As indicated above, this new paradigm is an accommodating one. Milbrath(1984) defines paradigm in terms of the dominant structure of beliefs that organise the way that society see and understand the working of the world around them. While there could be many reasons for the development of such partnership based paradigms, one of the most important is that a full-blown capitalist and environmentalist fight could have been too costly in monetary terms to people in the economic camp and too costly in environmental terms to people in the environmental camp, and could exacerbate the impact of social forces on the environment too. It is recognised that the population increase expected in the future is a major threat to environmental and economic stability( Fischer and Black, 1998). Hence, a partnership makes sense because an unstable supply of resources for exploitation and conservation goals may have led to a higher rate of natural capital exploitation and degradation, especially if it can be targeted to alleviate poverty and inequality. Elliott(1998) indicates that environmentally friendly development is aimed as the only way to prevent or to address poverty.

Therefore; compromise is a viable solution based on finding win-win situations and recognising that there are environmental limits to growth. Strong(1995) referred to the need of partnerships to implement the sustainable development agenda as "cooperative stewardship". However, when ever there are winners, there are losers, and in this case the losers are and will be those with social concerns, which within this model can not have direct means of expressing their concerns. Wars in the 21st Century will be fought over the control of a supply of increasingly scarce and costly natural commodities and their uses(Fischer and Black, 1998).

There are several indicators supporting the view that the eco-economic model is the dominant development paradigm today.

One indicator is the increasing level of interest in eco-economic modelling: efforts to model the interactions of the economy and the environment have increased in recent years and the need to improve existing indicator related methods is a very strong one. Work is underway related to Agenda 21(UN, 1996) and to the World Bank's program(WB, 1997) on how to measure sustainable development. INCA(1997) describe a wide range of ways of measuring progress and sustainable development at all levels of government and in industry. Moffatt( 1996) indicates that despite modelling difficulties, modelling sustainable development in developed countries and developing countries continues.

Another indicator is the increasing interest in the use of eco-economic incentives. Efforts have been directed to develop and implement incentives(voluntary or mandatory) that increase the chances of making economic activity both efficient and ecologically sustainable. Baden(1998) highlights that a critical aspect often ignored by decision-makers is that getting the incentives right requires carefully designed institutional arrangements.

A third indicator is the increasing interest in the use of eco-economic regulation: the importance of environmental regulation to induce responsible economic and environmental behaviour has been recognised and efforts are directed at designing acceptable standards related to safety, quality, performance, or scale. GOF(1998) describes how important environmental agreements, both binding and non binding, have become in the international arena today. Buell and DeLuca(1996) point out that the use of incentive based regulation should be part of sustainability program that is both cost-effective and constructive. A fourth indicator is the increasing interest in eco-economic institutions: the number of government and non-government institutions involved in the development and implementation of different environmentally friendly economic projects has increased dramatically. Lending institutions such as the World Bank have embraced formally the sustainable development concept. Serageldin and Sfier-Younis(1995) highlight that the Bank has a four point agenda: assisting borrowing countries in improving environmental stewardship; screening all World Bank financed projects to do no environmental harm; promote win-win strategies; and addressing global and regional challenges(see also WB, 1993).

Finally, a fifth indicator is the increasing interest in eco-economic development programs: most development programs, whether based on meeting human needs or traditional economic goals specially in developing countries are presented in a framework consistent with the eco-economic development framework; the promotion of social responsibility by proposing local and global win-win economic and environmental solutions. WB(1997) identify subsidy reduction leads to both increases in economic efficiency and decreases in negative environmental effects leading to a Win-Win policy where both economic and environmental agents are winners. On the other hand, institutions such as the International Union for the Conservation of Nature(IUCN) and the International Institute for Environment and Development(IIED) have even produced a handbook to

support the planning and monitoring of strategies for national sustainable development(Carew-Raid *et al.*, 1994).

### **iii. Two different development paradigms**

From the above discussion, it can be concluded that the eco-economic development model is made up of an array of economic and environmental incentives and regulations geared to induce the sustainable use of the remaining environment. Here, both economic and environmental goals are balanced out in order to advance this form of development. In other words the eco-economic development model is different from the economic development model since the later was composed of only a set of economic incentives and regulations. The different nature of these two development paradigms raises some important questions about the validity of existing traditional sustainable development approaches(where there are no limits to growth) and ecology-economic approaches(where there are environmental limits to growth) as they may not be based on the true nature and internal structure of the eco-economic development model. A few of those important questions are: is the economic development market the same as the eco-economic development market?; if not, how many invisible hands are there in the eco-economic development market?; and what are the environmental, social, and economic policy implications of this?.

### **iv. Specific goals of this paper**

The two specific goals of this paper are: to provide a simple qualitative framework which can be used to express development paradigms in terms of the sets of incentives and regulations underlying their dynamics; and to show how this simple framework can be used to provide answers to the questions posed above.

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## **The Qualitative Framework**

### **i. Qualitative terminology**

The qualitative terminology used in this paper is summarised in the Table I below.

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**Table I**

Qualitative terminology

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**R = Regulations**

**I = Incentives**

**R<sub>A</sub> = Social Regulation**

**R<sub>B</sub> = Economic Regulation**

<b>A = Active Social System</b>	<b>R<sub>C</sub> = Environmental Regulation</b>
<b>a = Passive Social System</b>	<b>I<sub>A</sub> = Social Incentives</b>
<b>B = Active Economic System</b>	<b>I<sub>B</sub> = Economic Incentives</b>
<b>b = Passive Economic System</b>	<b>I<sub>C</sub> = Environmental Incentives</b>
<b>C = Active Environmental System</b>	<b>EM = Economic Model</b>
<b>c = Passive Environmental System</b>	<b>ECM = Ecological Model</b>
<b>D = Development is present</b>	<b>EEM = Eco-Economic model</b>
<b>d = Development is absent</b>	<b>MM = Merged Model</b>

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## ii. Operational concepts

### Active system(AS)

It is a system that possesses two types of dynamics, internal dynamics and external dynamics. Internal dynamics refers to the interaction of factors or forces within the structure of the system. External dynamics refers to the interaction of this specific system with the external factors of another system. Active systems either react or dominate. For example, the expression  $AS_1 = A$  means that the active system( $AS_1$ ) in this case is a social system.

Active systems can also be expressed in terms of the set of incentives(I) and regulations(R) underlying their dynamic nature as follows:

$$AS = I + R$$

The above expression indicates that for active systems(AS) to work properly you need both incentives(I) and regulations(R). If there are only incentives(I) or only regulation(R), the system will break down. Hence, in the case of an active social system we have the following:

$$AS_1 = A = I_A + R_A$$

This expression indicates that when the active system( $AS_1$ ) is the social system(A), then we need social incentives( $I_A$ ) and social regulation( $R_A$ ) to achieve the optimal working of the social system.

### Passive system(PS)

It is a system that lacks internal and external dynamics. They are dominated systems unable to co-ordinate internal forces and to counteract external forces. For example, the

expression  $PS_1 = a$  means that the passive system( $PS_1$ ) is made up of a passive social system.

Passive systems can also be expressed in terms of the incentives and regulations underlying its passive nature as follows:

$$PS_1 = a = I_a + R_a$$

The above indicates that when the passive system( $PS_1$ ) is the social system( $a$ ), then both social incentives( $I_a$ ) and social regulations( $R_a$ ) are passive elements.

### **Paradigms**

Harper(1996) defines paradigms as implicit models underlying the working of a world that is widely shared by a society or group. Hence, Paradigms( $P$ ) can be defined as specific ideological views of the world which are based on or derived from how active systems, passive systems or any combination of them interact with each other. Then, the main characteristics of the paradigm( $P$ ) can be extracted from the set of active and passive systems that make up its over all structure. For example, the expression  $P_1 = Abc$  means that the paradigm( $P_1$ ) is composed of an active social system( $A$ ), a passive economic system( $b$ ), and a passive environmental system( $c$ ). This paradigm indicates that social forces are the dominant forces and that the economy and the environment exist solely for the purpose of satisfying society's wants. Failing economies and a degraded and polluted environment are assumed not to have any impact on the social system. Other paradigms, such as deep ecology paradigms or deep economy paradigms can be extracted in similar fashion as the social paradigm described above.

### **Paradigm mergers**

When more than one paradigm exist within the same development unit or geographic area, they may persist as separated paradigms in the short to medium term, but their dominant systems will merge in the long-run as a result of the competition induced by their contradictory presence if win-win situations exist. For example, if there are two different paradigms, then we have:

$$P_1 = Abc$$

$$P_2 = abC$$

$$\overline{P} = \overline{AbC}$$

The situation above indicates that if we have two different paradigm within the same development area,  $P_1$  and  $P_2$ , and there are win-win alternatives, then they will merge in the long



run to form paradigm P. As it can be seen, paradigm P retained the active and passive characteristics of the two original paradigms.

### **Paradigms in terms of incentives and regulations**

Paradigms structures can be expressed in terms of incentives and regulations by following a three step approach. First we express the systemic paradigm structure as the sum of its different parts. Next, we eliminate the systems that are passive as they are not relevant for changing conditions in the paradigm. And finally, we express the active elements in terms of incentives and regulations as shown in detail above. For example, if the paradigm of interest is  $P_1 = Abc$ , then the three steps are:

Step one       $P_1 = Abc = A + b + c$

Step two       $P_1 = Abc = A$

Step three      $P_1 = Abc = I_A + R_A$

Hence, to express paradigms in terms of incentives and regulations we need to use only the incentives and regulations of the systems that are active given that the presence of passive incentives and regulations within the paradigm does not matter.

### **Diversity of development paradigms**

It is possible to uncover all the possible development paradigms that result from the active and passive interaction of social, economic, and environmental systems by means of the following model:

$$D = A + B + C$$

$$d = abc$$

This model indicates that there is development(D) when the social system(A), the economic system(B), the environmental system(C) or any combination of them are present in an active form. And there is no development(d) when the three systems are present in a passive form. Table II below describes all possible development paradigms. Column 1 indicates the paradigm type; column 2 indicates the systematic structure of each paradigm type; column 3 indicates the dominant system structure of each type of paradigm; and column 4 describes the incentive/regulation structure of each type of paradigm.

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**Table II****Development paradigms and their different structures**

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Column 1	Column 2	Column 3	Column 4
Development Paradigms	System Structure	Dominant Structure	Incentive/regulatory Structure
<b>D<sub>1</sub></b>	= <b>abc</b>	= <b>None</b>	= <b>Passive Structure</b>
<b>D<sub>2</sub></b>	= <b>Abc</b>	= <b>A</b>	= <b>I<sub>A</sub> + R<sub>A</sub></b>
<b>D<sub>3</sub></b>	= <b>aBc</b>	= <b>B</b>	= <b>I<sub>B</sub> + R<sub>B</sub></b>
<b>D<sub>4</sub></b>	= <b>abC</b>	= <b>C</b>	= <b>I<sub>C</sub> + R<sub>C</sub></b>
<b>D<sub>5</sub></b>	= <b>ABc</b>	= <b>A + B</b>	= <b>I<sub>A</sub> + R<sub>A</sub> + I<sub>B</sub> + R<sub>B</sub></b>
<b>D<sub>6</sub></b>	= <b>aBC</b>	= <b>B + C</b>	= <b>I<sub>B</sub> + R<sub>B</sub> + I<sub>C</sub> + R<sub>C</sub></b>
<b>D<sub>7</sub></b>	= <b>AbC</b>	= <b>A + C</b>	= <b>I<sub>A</sub> + R<sub>A</sub> + I<sub>C</sub> + R<sub>C</sub></b>
<b>D<sub>8</sub></b>	= <b>ABC</b>	= <b>A + B + C</b>	= <b>I<sub>A</sub> + R<sub>A</sub> + I<sub>B</sub> + R<sub>B</sub> + I<sub>C</sub> + R<sub>C</sub></b>

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The terminology, the six operational concepts, and the information in Table II described above are used below to frame the economic and eco-economic development paradigms in such a way as to allow us to fulfil the goals being pursued in this paper. Notice, the all development models D<sub>2</sub> to D<sub>8</sub>, mutually exclusives or not, can be made consistent with the definition of Sustainable Development provided by the Bruntland Commission(WCED 1987), which is partly consistent with the observation of Elliott(1998) that the commission's concept can be met via several mutually exclusive strategies.

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## **The economic development model**

### **i. The nature of the economic development model**

From the discussion in the introduction, three fundamental premises underline the nature of the economic development model: that the environment and society are there available for the production of goods and services to be sold in the market place; that economic growth is paramount; and that economic incentives are the driving forces behind the invisible hand of sound economic policies. Therefore, the economic development model assumes that the environment(c) and society(a) are passive elements in the development process and that the economy(B) is the only active and dominant element of the system. This can be expressed in qualitative systematic terms as follows:

$$EM = aBc, \text{ where } EM = \text{Economic Model}$$

### **ii. Linking the nature of the economic model to a specific paradigm**

By matching the system structure of the above economic model(EM) with the list of system structures provided in column 2 of Table II, we can see that the structure aBc matches the system structure of paradigm D<sub>3</sub> as indicated in column 1. Hence, the economic model(EM) possesses the incentive/regulation structure of paradigm D<sub>3</sub> shown in column 4 of Table II. Therefore, based on the above, the following is true:

$$EM = aBc = D_3$$

$$EM = D_3 = I_B + R_B$$

In summary, the economic development model(EM) is the same as paradigm D<sub>3</sub> and it has an incentive/regulation structure based on economic objectives only.

### **iii. Uncovering the invisible hands in the economic model**

Once we know the incentive/regulation structure we can find where the invisible hands are by looking at what happens when the incentive/regulation structure changes as the result of changes in the economic objectives of the paradigm. In this case, the following hold true:

$$\begin{aligned} X(\text{EM}) &= X(\text{D}_3) = X(\text{I}_B + \text{R}_B); \quad \text{Where } X = \text{change} \\ &= X(\text{I}_B) + X(\text{R}_B) \end{aligned}$$

Since  $X(\text{R}_B) = 0$  due to that economic regulations are fixed items, then we have:

$$X(\text{EM}) = X(\text{D}_3) = X(\text{I}_B)$$

The above indicates that changes in economic incentives [ $X(\text{I}_B)$ ] are the driving forces of the economic development model, and therefore, of its invisible hands. The existence of economic based invisible hands is consistent with traditional economic theory.

Figure 1 below can be used to put into context the role of this economic development paradigm with respect to the process of forest land (FA) conversion to non-forest uses (DFA).

**Figure 1**  
**Incentives and the economic model**

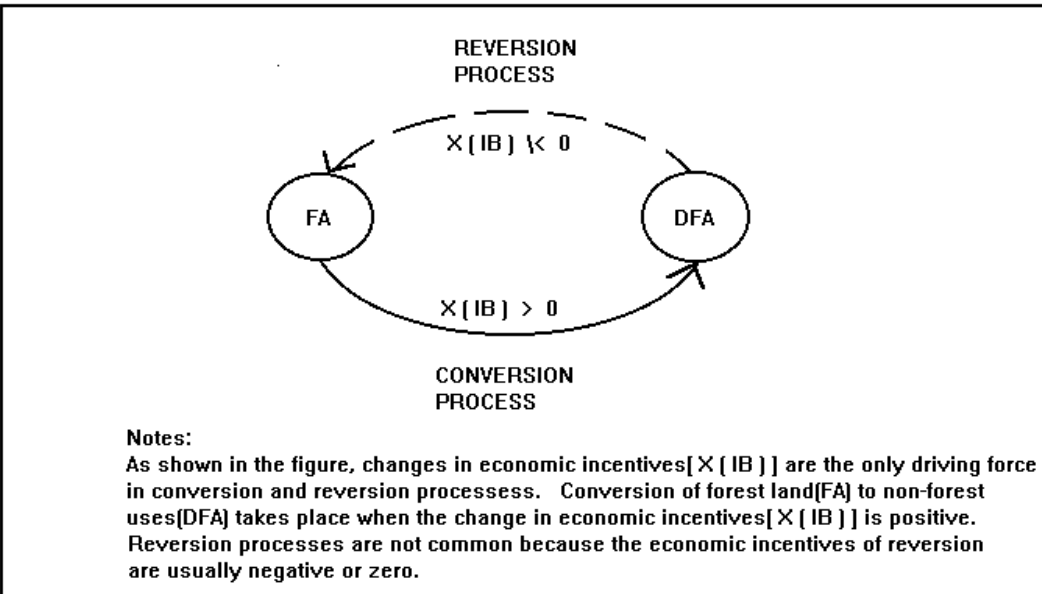


Figure 1 shows that changes in the economic incentive structure are the driving force behind the conversion of forest lands (FA) to other uses (DFA). As the level of economic incentives [ $X(I_B)$ ] for conversion changes, the rate of conversion changes. Three scenarios are possible:

**if  $X(I_B) < 0$ ; forest land will be left abandon.**

**if  $X(I_B) = 0$ ; we are indifferent on the type of use**

**if  $X(I_B) > 0$ ; forest land conversion takes place**

The above indicates that as the change in economic incentives increases, the rate of forest land (FA) conversion to other uses (DFA) increases, and as the change in economic incentives decreases, the rate of forest land (FA) conversion decreases.

Notice that the change in economic incentives [ $X(I_B)$ ] for non-forest land (DFA) reversion to forest uses (FA) is usually perceived negative or zero, and if positive, they are perceived as lower than the change in economic incentives for conversion since it is usually more economic to convert forest land (FA) to other uses (DFA) than to revert non-forest land to forest uses. This may explain why reforestation programs within the economic development model failed to achieve their desired reforestation goals and deforestation continue an upward trend. Finally, notice that in the economic development model as indicated by the structure of incentives described above, the decision to protect or use forested areas and the decision to revert or intensify the use of deforested areas depend on which option offers the highest economic return.

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## **The eco-economic development model**

### **i. The nature of the eco-economic development model**

Three fundamental premises of the eco-economic model that can be derived from the introduction are: that society must learn to live within the limits of the environment and of the economy; that the economy must behave in ways that are environmentally friendly; and that there is a set of economic and environmental activities that can be placed in a win-win situation. The above notion apparently assumes that "only the economic invisible hand" is present in the eco-economic development market and remains as the only driving force. To my knowledge nobody has expressed the possibility of having more than one invisible hand in the market.

Therefore, the eco-economic development model assumes that society (a) is a passive element in the development process and that the economy (B) and the environment (C) are the two active and dominant elements in the paradigm. The Bruntland Commission (WCED 1987) specifically called for the integration of environment and economic development. This can be expressed in qualitative systematic terms as follows:

**EEM = aBC ; Where EEM = Eco-Economic Model**

### **ii. Linking the nature of the eco-economic model to a specific paradigm**

By matching the system structure of the above eco-economic model (EEM) with the list of system structures provided in column 2 of Table II, we can see that it matches the structure of paradigm  $D_6$  as indicated in column 1 and it possesses the incentive/regulation structure of paradigm  $D_6$  shown in column 4.

Hence, in this case, the following is true:

$$\mathbf{EEM} = \mathbf{aBC} = \mathbf{D}_6$$

$$\mathbf{EEM} = \mathbf{D}_6 = \mathbf{I}_B + \mathbf{R}_B + \mathbf{I}_C + \mathbf{R}_C$$

Therefore, the eco-economic development model(EEM) is the same paradigm as  $D_6$  and it has an incentive/regulation structure based both on economic and environmental objectives.

### iii. Uncovering the invisible hands in the eco-economic model

Again, once we know the incentive/regulation structure we can find where the invisible hands are by looking at what happens when the incentive/regulation structure changes as the result of changes in the ecological and economic objectives of the eco-economic development paradigm. In this case, the following holds true:

$$\begin{aligned} \mathbf{X(EEM)} &= \mathbf{X(D}_6) = \mathbf{X(I}_B + \mathbf{R}_B + \mathbf{I}_C + \mathbf{R}_C) ; \text{ Where } \mathbf{X} = \text{change} \\ &= \mathbf{X(I}_B) + \mathbf{X(R}_B) + \mathbf{X(I}_C) + \mathbf{X(R}_C) \end{aligned}$$

Since  $X(R_B) = X(R_C) = 0$  due to that economic and environmental regulations are fixed items, then we have:

$$\mathbf{X(EEM)} = \mathbf{X(D}_6) = \mathbf{X(I}_B) + \mathbf{X(I}_C)$$

The above indicates that changes in economic incentives[ $X(I_B)$ ] and changes in environmental incentives[ $X(I_C)$ ] are the driving forces in the eco-economic development model (EEM), and hence of its two invisible hands. The existence of two invisible hands within the eco-economic development market is a conclusion not consistent with traditional economic theory. The implication of the above is that the economic invisible hand may not have a dominating role in the eco-economic market place all the time.

Figure 2 below can be used to put the role of the eco-economic development market in context with respect to the process of forest land(FA) conversion to other land uses(DFA).

**Figure 2**  
**Incentives and the eco-economic model**

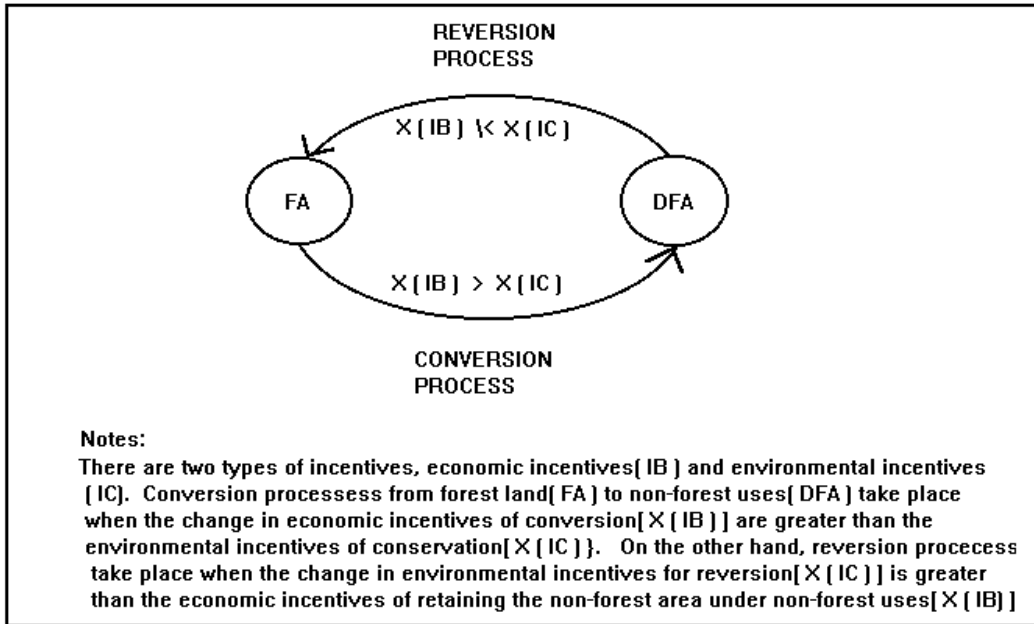


Figure 2 indicates the following situations. If the economic incentive of conversion[ $X(I_B)$ ] is greater than the environmental incentive for conservation[ $X(I_C)$ ], the common process of forest land conversion to other uses will continue its course. Here, there are no incentives to conserve. When the opposite situation, holds true, then remaining forest areas will be conserved. There are no incentives for conversion. When the economic incentive to conversion is equal to the environmental incentive for conservation, then economic and environmental agents may be either indifferent or will follow paradigm lines to divide the remaining forest resource in a win-win situation. On the other hand, if the environmental incentive of reverting non-forest land to forest uses[ $X(I_C)$ ] is greater than the economic incentive of continual non-forest uses[ $X(I_B)$ ], then a process of reversion of land from non-forest uses to forest uses will take place. Here, there are incentives for reverting non-forested land to forest uses. When the opposite holds true, then non-forest land uses are more profitable as they are and will continue to operate as non-forest uses. When the environmental incentive for reversion is equal to the economic incentive of retention in



non-forest uses, then again economic and environmental agents will be either indifferent or will divide the non-forested areas according to paradigm lines in win-win options.

Therefore, there are two different forces in the eco-economic development market, the economic forces and the environmental forces, and the dominant one will be the one that has the highest incentive present in that market. In other words, in the eco-economic model the decision to protect or exploit the remaining forest areas and the decision to revert or intensify the use of deforested areas depends on which market incentive is higher, economic or environmental.

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### **Merging paradigms**

The structure of the eco-economic development market highlights the possibility of the formation of new development paradigms as the result of the merging of previous ones. For example, consider the following situation from Table II:

$$D_3 = aBc = B = I_B + R_B = \text{EM Model}$$

$$D_4 = abC = C = I_C + R_C = \text{ECM Model}$$

$$\overline{D_6} = \overline{aBC} = \overline{B + C} = \overline{I_B + R_B + I_C + R_C} = \overline{\text{MM Model}}$$

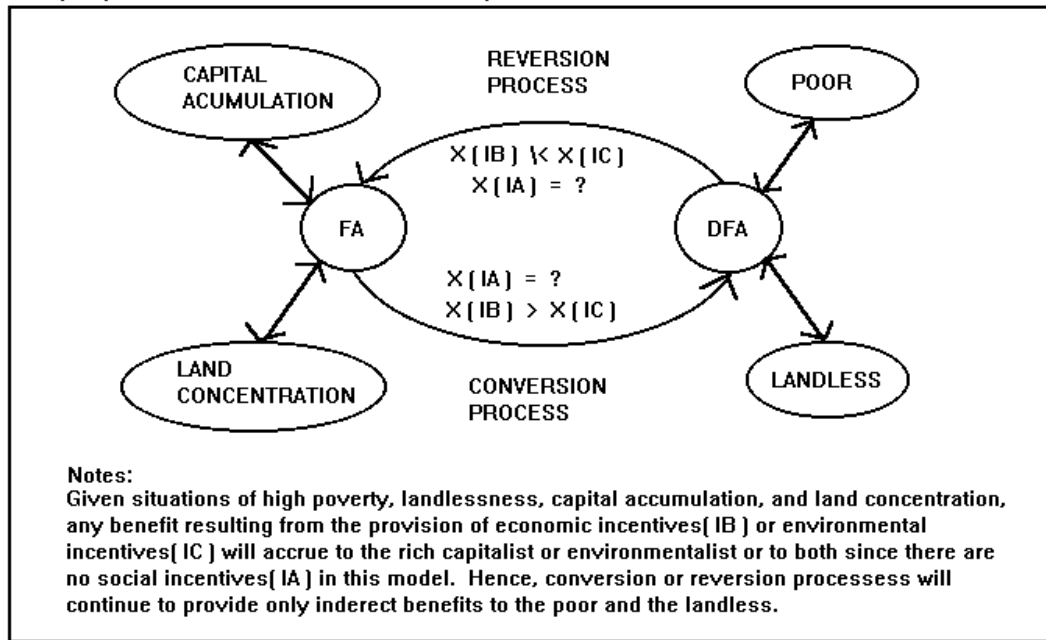
Hence, the eco-economic development model paradigm( $D_6$ ) appears to come about from the combination of the economic development paradigm( $D_3$ ) and the ecological development paradigm( $D_4$ ). In other words, the eco-economic development model(EEM) is a merged model(MM) that results from the collusion of the economic model(EM) and the ecological model(ECM). Notice, that both the economic model(EM) and the ecological model(ECM) have only one invisible hand in the market since in each case only their self-interest would prevail. Notice that the set of sustainable development indicators related to Agenda 21(UN 1996) for example, can be grouped into two sub-sets, incentive related indicators and regulation related indicators, which could be consistent with the above structure.

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### **Policy implications**

Some of the most important policy implications related to the working of incentives in the eco-economic development model (especially in developing countries) can be easily appreciated by looking at Figure 3 below:

**Figure 3**  
**Policy implications of the eco-economic development model**



The structure highlighted in this figure reflects the most common socio-economic conditions in less developed countries: most forest area(FA) and deforested area(DFA) and wealth are concentrated in few hands; and landlessness and poverty are high;

The important aspects and policy implications in this Figure 3 can be summarised as follows:

First, policies that increase the value of forest areas(FA) will lead to a process of conservation and capital accumulation that will benefit only the rich as they will maximise their land concentration powers. Hence, this type of growth would not be in line with the goal stated by the Bruntland Commission related to using economic growth to reduce poverty and underdevelopment (WCED).

Second, policies that decrease the value of existing non-forested areas(DFA) will lead to a process of reversion of land from non-forest uses to forest uses which again only benefits the rich as they are the owners of the land and capital needed for long term investment projects. Hence,

win-win strategies consistent with the ones recommended by the World Bank(WB 1997) such as reducing subsidies to produce this effect would lead to a worsening of social conditions since they would make existing levels of poverty, landlessness, and inequalities worse. Hence, the prospect of global unsustainability under these policies is real. This way, it is impossible to solve the sustainability problem posed by Common(1998), which he defines as how to address inequality and poverty in environmentally friendly ways so as to maintain society's future choices.

Third, restoration programs(global or local) involving degraded forest areas or deforested areas and using the poor and the landless as labour force may bring some social stability in the short and medium-term, but not in the long-term. This is because in the long-term when all forested area and deforested area are in perfect state, they will still belong to the rich, and the levels of poor and landless people will be still higher at the present pace. Hence, this may plant the seed for the maximisation of the "social tragedy of the eco-economic development commons" where economic and environmental agents reap off the benefits while only social agents share in the costs. Remember, in the tragedy of the commons in the economic development model, economic agents got the full benefit, and environmental and social agents bear the cost, even though environmental agents were not recognised at that time as sufferers or losers since they were voiceless and dormant some where within the economic system. This is consistent with Gladwin(1998) observation that economic globalization perpetuates processes of resource degradation induced by poverty.

Fourth, consistent with the above and shown in Figure 3, since the social system in the eco-economic model is passive, it does not have direct incentives and acceptable regulations to benefit from the economic and environmental program being implemented. Indirect incentives and imposed regulation only defuse the problem to future generations. For example, worsening poverty conditions will lead to a decrease in people's ability to invest in environmentally sustainable activities, and increase their propensity to engage in environmentally destructive patterns of behaviour, which is the opposite of the desired impact indicated by Elliott(1998). Hence, the eco-economic development model does not appear to be in a position to solve the problem of poverty, landlessness, wealth, and capital concentration in the short term, and it seems that it has the seeds for its own destruction since it appears to be in a long term collision course with the social system. This conclusion is consistent with the paradox summarised by Common(1998) when indicating that any significant redistribution program has the potential for social unrest; and increasing growth now implies decreasing growth in the future. This in turn implies future social conflict, as well as a failure to alleviate future poverty.

And fifth, the impact of other factors on the process of land reversion or conversion such as the impact scarcity or technological innovations can also be appreciated in figure 3. For example, scarcity of forest areas or scarcity productive deforested areas or technological innovations increasing either the productivity of deforested areas or the value of forested areas will improved the expected economic and/or environmental incentives of all land uses. All these benefits again will

accrue directly to the rich who own both remaining forested areas and productive deforested areas, worsening still more the eco-economic and social gap.

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## Conclusions

Several important conclusions can be made. The first one is that the economic development model and the eco-economic development model are two very different paradigms. The second conclusion is that the existing of two invisible hands in the eco-economic development market indicates different policy implications. The third conclusion is that the structure of incentives in the eco-economic development model as shown in Figure 3 benefits directly the rich eco-economic agents(eco-capitalists), and sends the problem of poverty and landlessness wide into the future. Fourth, the inactive role of the social system within the eco-economic model indicates that it will have to become unsustainable in the long run when the full benefits from the economic and environmental investment made today accrue only to the future rich generations. In the mean time, as time passes and the social system is not actively incorporated into the development process, social behaviour toward the remaining environment will become more irrational in the minds of people outside this group of stakeholders. The fifth conclusion is that in the worse case scenario, when the last win-win decision is made, it may take away the last non-critical segment of the natural capital left over outside the eco-economic development model sending social forces desperately towards the critical capital left untouched.

The sixth conclusion is that the social tragedy of eco-economic development commons differs from the tragedy of the commons in the economic model in that in the tragedy of the commons only economic agents (capitalists) benefited from development actions while in the social tragedy both economic agents(capitalists) and environmental agents(environmentalist)benefit. However, the commonality of the two commons is that society bears or share in the cost. And the last conclusion is that under the above scenario, the sooner humanity embraces the sustainability path, the more likely is that the eco-economic/ social clash that we are passing to future generations can be avoided and the more likely is that an optimal socio-eco-economic development route can be found.

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