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Traditional Forestry, Sustainable Forestry, and Forestry Sustainability: Expressing Evolving Forestry Practices Using Qualitative Comparative Conjunctural Interactions

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Abstract

One of the main underlying characteristics of a science is that its fundamental principles are constantly changing to reflect the changing values of society, and forestry is not the exception. When environmental and social values were considered irrelevant for the management of forestry practices traditional forestry, forestry ruled by economic values only, was dominant. As the need to include environmental concerns became binding, then traditional forestry was replaced by the sustainable forestry model. And currently, the need to deal with social issues may induce the sustainable forestry model to evolve again.

Usually discussions about dominant paradigms are presented in ways surrounded by complex rhetoric, and this makes it difficult to appreciate their internal structures and to compare them to follow with ease how and in which direction forestry programs may have or may evolved. This paper provides a qualitative comparative framework that can be used to express and compare internal paradigm structures as well as to appreciate evolutionary changes in simple terms.

Introduction

Forestry can be defined as the set of practical and theoretical concepts and tools that permit the management of forested and deforested areas in accordance to dominant views of development. As new dominant views of development replace old ones, the internal structure or goals of the forestry model change reflecting new values and social attitudes.

Below there is a general description of how forestry programs have evolved from traditional economic roots alone to its green form and to the possible evolution towards a sustainability form.

a) Traditional forestry

It is known that traditionally forestry was used and promoted as a source of economic values only. Pearce(1996) points out that forest policy was decided until very recently on the economic value of timber alone as the value of non-timber products and services, with markets

and without markets, was left out of the model. Hence, forestry programs and plans were directed at the creation of value through the transformation of existing forested areas into timber commodities or through the conversion of existing deforested areas into plantations.

As such, this was the economic value driven forestry model where non-timber values and non-economic values were not considered relevant when planning the management of forested and deforested lands. As Non-timber issues became relevant, a shift in the design and implementations of forestry programs and practices started to take place. The Centre for International Forestry Research reports that it took increased interest on the role of non-timber forest products in 1998 as a potential tool for planning effective development and conservation programs and it began major global efforts to research and understand better the role non-forest products issues in development(CIFOR 1998).

b) The greening of traditional forestry

The increasing importance of environmental concerns and the need to include ecological values within forestry programs has led to the redefinition of these programs and their tools so as to make them the principal components of a new eco-economic engine, a system capable of creating both economic and ecological values at the same time.

Hence, there is a need now to adjust traditional forestry programs to incorporate non-timber products and services issues too; and discussion, research and action on how to best do this is currently underway. For example, it became relevant now the need to understand the role of and to assess the size of non-timber values to support management/land use decisions(Pearce 1996); The goals of protection and sustainable use of forests in a balanced way became central concept to forestry strategies of institutions like the World Bank(WB 2003); A survey of different approaches to deal with payment for environmental services implemented in the western hemisphere has been carried out to determine best practices and conditions for success(Mayrand and Paquin 2004) as well as approaches aimed at creating markets for biodiversity had been discussed and proposed(OECD 2004); and Interconnecting issues such as climate change and forest are now of central concern to existing forestry commissions such as the North American Forestry Commission(FAO 2008).

The forestry model in which ecological concerns are paired with economic concerns is the one now known as the sustainable forestry model, and which the author calls the eco-economic forestry model.

c) Evolving forestry practices

Recently, another forestry concern has been added to the discussion: the need to incorporate social issues within the eco-economic forestry model. For example, the growing need to add social interactions to the environment-economy connection is behind the elaboration of the reference manual for the integrated assessment of trade- related policies available now to both developed and developing countries alike for consideration and use(UN 2001); The use of sustainable resource management is seen now as a key tool to deal with poverty issues(UN 2002); and one of the key changes to the development as usual model that need to be made to attain a sustainable economy is the inclusion of social/poverty issues(Gardner and Prugh 2008).

The need to account for social concerns is based on the premise that the incorporation of economic and ecological values is a necessary, but not a sufficient condition for sustainability to take place, including forestry sustainability. Hence, the evolution of forestry practices is driven by the substitution of old value systems by new ones, and this evolution appears to be heading towards forestry sustainability. In other words, the need to include social issues will push sustainable forestry towards sustainability forestry when they become binding. The United

Nations Environmental Program Year Book for 2009 proposes in Chapter 1 the need to manage ecosystems in ways that efficiently deal with the poverty issue(UNEP 2009), hence making the incorporations of social concerns in development essential to sustainability.

d) The need to express paradigm structures and trace evolutionary changes in simple terms

Usually discussions about dominant paradigms are presented in ways surrounded by complex rhetoric, and this makes it difficult to appreciate their internal structures and to compare them to follow with ease how and in which direction forestry programs may have or may evolved. This paper provides a qualitative comparative framework that can be used to express and compare internal paradigm structures as well as to appreciate evolutionary changes in simple terms.

The Goals of the paper

This paper has the following goals: To present a simple qualitative comparative framework that permits the identification and grouping of all possible types of desirable forestry programs; To link the structure of specific models within this framework to known forestry paradigms; To show using qualitative comparative conjunctural interactions that new forestry paradigms are the result a paradigm merging process and use this information to point out how new paradigms differ from previous ones.

Terminology

Table 1 below lists the qualitative comparative terminology used in this paper.

Table 1

A = Social values dominant	a = Social values passive
B = Economic values dominant	b = Economic values passive
C = Ecological values dominant	c = Ecological values passive
1 = Value present	0 = Value absent

Methodology

First, a desirable forestry model is introduced. Second, a table is provided containing all forestry programs consistent with the model above together with their qualitative comparative coding, formula, and the forestry paradigm type. Third, all possible forestry programs are summarized in four groups: fully unsustainable forestry programs, single dominance forestry programs, dominant partnership forestry programs, and fully sustainable forestry program. Fourth, a specific single dominance model, a specific dominant partnership model, and the fully sustainable forestry program are linked to traditional forestry, sustainable forestry and forestry sustainability respectively. Fifth, it is shown how current forestry paradigms have evolved from past paradigms and how current forestry programs may evolved to future paradigms when

development goals change using qualitative comparative conjunctural interactions. And finally, some specific and general conclusions are provided.

The desirable forestry program model

All possible forestry programs can be derived by means of a desirable forestry program model(F), which can be stated as below:

$$F = A + B + C$$

The above desirable forestry model(F) indicates that the type of forestry program depends on whether or not it includes only social values(A) or only economic values(B) or only ecological values(C) or any combination of them at the same time. Table 2 below shows all eight possible types of forestry program that can be derived from the formula stated above; their qualitative comparative representation in present/absent form; their specific formula, and their corresponding forestry paradigm type.

Notice that the qualitative information in Table 1 shows that capital letters indicate that a specific value is dominant; and that lower case letters imply that a specific value is passive. On the other hand, a number 1 indicates that a specific characteristic is present and a number 0 represents that a specific characteristic is absent.

Table 2

Different types of forestry programs

Program Type	A	B	C	Qualitative Formula	Forestry Paradigm
F1	0	0	0	F1 = abc	Unsustainable forestry
F2	1	0	0	F2 = Abc	Deep Social forestry
F3	0	1	0	F3 = aBc	Deep economic forestry
F4	0	0	1	F4 = abC	Deep ecology forestry
F5	1	1	0	F5 = ABc	Socio-economic forestry
F6	1	0	1	F6 = AbC	Eco-social forestry

F7	0	1	1	F7 = aBC	Eco-economic forestry
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F8	1	1	1	F8 = ABC	Forestry sustainability
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Types of forestry programs

Based on the qualitative information in Table 2 above, all of the 8 forestry program models can be separated in four specific groups: the fully unsustainable forestry program; single dominance forestry programs; dominant partnership forestry programs; and fully sustainable forestry programs. Each of these groups of programs is described below in general terms.

i) The fully unsustainable forestry program

When the forestry program does not reflect social values(a), economic values(b) and ecological values(c) at the same time, we have the worse forestry program. This is stated as F1 = abc in Table 2 above since under this program the role of social(a), economic(b), and ecological(c) values is not clear.

ii) Single dominance forestry programs

When only one of the values is reflected in the forestry program, we have single dominance forestry programs. According to the information in Table 2, there are three types of these single dominance forestry programs: deep social forestry(F2 = Abc), where only social values are relevant; deep economic forestry(F3 = aBc), where only economic values matter; and deep ecology forestry(F4 = abC), where only environmental values prevail.

See that in all cases, dominant value systems need the presence or existence of two dominated value systems in order to be sustained. Notice that the single dominance forestry program that prevailed in the past from those three possibilities is the deep economic forestry program(F3 = aBc). Moreover, see that traditional forestry is consistent with deep economic forestry paradigm(F3 = aBc) as the core aspects of traditional forestry are the same as those of deep economic forestry which are economic values only, and the view that society(a) and the environment(c) are out there to fulfill economic goals only.

iii) Dominant partnership forestry programs

When two values are reflected in the forestry program, then we have dominant partnership forestry programs. According to Table 2 above there are three types of dominant partnerships: socio-economic forestry(F5 = ABc), where both social and economic values are reflected; eco-social forestry(F6 = AbC), where both ecological and social values are included in the decision-making process; and eco-economic forestry(F7 = aBC), where both economic and environmental values are promoted.

In this case, notice that each type of dominant partnership needs the presence or existence of one dominated value system in order to be able to be sustained. Notice also that from those three possible dominant partnership forestry programs, the eco-economic forestry program(F7 = aBC) is prevailing right now.

Additionally, see that a) since sustainable forestry is defined as the integration of economic and ecological concerns, then sustainable forestry is consistent with the structure of the eco-

economic forestry model($F7 = aBC$), which as mentioned above is the dominant forestry paradigm today; and b) sustainable forestry needs social values to be in dominated form to be sustained. In the eco-economic forestry model($F7 = aBC$) society exist to meet eco-economic goals only as it is in the case of the sustainable forestry model.

iv) The fully sustainable forestry program

When we have all three values, social(A), economic(B), and ecological(C), reflected in the forestry program at the same time we have a fully sustainable forestry program. This is expressed in Table 2 above as $F8 = ABC$. See that under this fully sustainable model($F8$), all value systems are in dominant form and actively interacting, which implies the disappearance of dominated value systems.

Hence, this fully sustainable forestry program($F8$) is consistent with the concept of forestry sustainability, as sustainability is usually defined as the framework that incorporate social(A), economic(B), and ecological(C) values at the same time. Moreover, notice that under a fully sustainable framework($F8$), we can no longer seek the maximization of one or two value systems: we must now seek the optimization of the three interacting systems.

Evolving forestry practices

i) The present:

When looking at the qualitative comparative formula of the current dominant forestry paradigm, sustainable forestry($F7 = aBC$) in Table 2 it can be seen that it came out of making the traditional forestry program($F3 = aBc$) consistent with environmental concerns($F4 = abC$), which can be stated as follows in conjunctural form:

$$F7 = (F3)(F4) = (aBc)(abC) = aBC$$

In other words, the sustainable forestry program($F7$) reflects both economic and environmental goals as environmental concerns are now endogenous to the model and are therefore relevant. Notice that dominance prevails over passiveness when in conjunctural interactions as merging takes place. Hence, the difference between the traditional forestry model($F3$) and the sustainable forestry model($F7$) can be expressed in environmental terms.

ii) The future:

As the need to incorporate social concerns within the current sustainable forestry program reaches the point of unavoidability, then Table 2 shows that a paradigm shift towards forest sustainability will take place. In other words, forestry sustainability($F8 = ABC$) will take place when the sustainable forestry program($F7 = aBC$) is adjusted to reflect social concerns($F2 = Abc$), as represented below:

$$F8 = (F7)(F2) = (aBC)(Abc) = ABC$$

Therefore, the sustainability forestry program($F8$) reflects social, economic and environmental goals at the same time as social and environmental concerns will be then endogenous to the model and hence relevant. Notice again that dominance prevails over passiveness when in conjunctural interactions as merging takes place. Hence, the difference

between the sustainable forestry model(F7) and forestry sustainability model(F8) can be expressed in social terms.

Specific conclusions

Some important conclusions can be drawn from the above discussion and the qualitative comparative information detailed in Table 2.

First, when there are no clear social, economic, and environmental goals we have the worse type of forestry program(F1 = abc). Second, traditional forestry(F3 = aBc) is the single dominance model where only economic goals matter. Third, the sustainable forestry program(F7 = aBC) is the traditional forestry program adjusted to reflect environmental issues, and hence, it is the dominant partnership model where only economic and environmental concerns are relevant.

Fourth, Forestry sustainability(F8 = ABC) is the sustainable forestry program adjusted to incorporate social issues, and therefore, it is the fully sustainable forestry model as social, economic, and environmental goals are relevant at the same time. Notice then that forestry sustainability requires the optimization of the three interacting value systems, society(A), economy(B), and environment(C), and therefore, this paradigm is not consistent with seeking the maximization of value systems in isolation or partnerships. And fifth, it can be seen that the qualitative comparative framework introduced allows us to express forestry paradigms in a way useful to appreciate their changing nature as they evolve.

General conclusions

It was shown that the qualitative comparative framework introduced in this paper allows us: a) to express the specific internal structure of all possible forestry paradigms; b) to show that under qualitative comparative conjunctural interactions when paradigms are adjusted to reflect new value systems and concerns they go through a merging process ruled by dominance; c) to stress that the necessary and sufficient condition for forestry sustainability(F8 = ABC) to exist is that the forestry program must reflect the presence of social(A), economic(B), and environmental(C) values at the same time; and d) to highlight that the difference between the currently dominant eco-economic forestry model or sustainable forestry(F7 = aBC) and forestry sustainability(F8 = ABC) can be expressed in social terms.

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