

Conservation of Tropical Rain Forests: Arguments, Beliefs and Convictions

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ABSTRACT

A questionnaire listing 21 arguments that have been used to justify the conservation of tropical rain forests was sent to a selection of scientists, conservationists, teachers and others with an interest in rain forest. Recipients were asked to rate each argument on two accounts: according to their personal beliefs, and for convincing others. Responses were examined to reveal which arguments scored highly and how divergent were the two ratings. The influences of sex, occupation and first-hand experience of the rain forest environment in different geographic regions were also examined. Arguments concerned with the economic management of rain forests were rated more highly when used to persuade others than when defining personal beliefs. Arguments concerned with aesthetic appreciation of the rain forest were not rated highly in either context.

INTRODUCTION

Amidst the mass of information on soils and rainfall, on agroforestry and selective logging, about rain forest people and medicinal plants, species diversity and the global climate, and bad planning and no planning, it is easy to forget the rain forest itself and how it appears to the observant visitor: the gloomy twilight below and the iridescent canopy above, the great quietness broken by brief snatches of sound, the canvas of green and brown with rare glimpses of vivid reds, blues and yellows, and the occasional revelations of

TABLE 1

The 21 Arguments Listed in the Questionnaire as Reasons for Conserving Tropical Rain Forest

Aesthetic Values

1. They are areas of unique beauty presenting the richest scenes of life on land.
2. They are areas where people can be revitalised or uplifted.
3. There is excitement to life just because such areas of wildlife and wilderness exist which are not fully known.
4. They are areas with minimal signs of external human interference.

Biological Uniqueness

5. They contain a large number of plant and animal species and a great variety of different life forms.
6. They contain many rare endemic species.

Economic Management

7. They can be managed for a continuous yield of hardwoods.
8. They can be managed to provide a wide variety of other natural resources including rattan, bamboo, edible vegetables, fruits, nuts, spices, resins, fibres, medicines, ornamental plants, and animal products.
9. They can be managed to preserve the maximum number of species of plant and animal, ensuring many new resources of benefit to mankind in the future.
10. They can be managed to encourage tourism.

Education and Research

11. They provide a focus for educating the children of many nations about the natural environment, forest products and general biology.
12. They form part of the national heritage of many countries.
13. They provide the potential for applied research and discovery of new drugs, insecticides and crops.
14. They are very inadequately known botanically and zoologically, and as regards soils and weather.
15. They provide potential and inspiration for basic research in the fields of earth, life, and social sciences.

Moral Responsibility

16. We have a moral responsibility as custodians of the earth to manage our environment properly.
17. It is unethical to destroy any living organism.
18. The study of natural objects and processes is a way of serving God.
19. They are the natural habitat of certain indigenous peoples.

Regulation of the Physical Environment

20. They increase local rainfall. By regulating water release, they also provide a more constant water supply which reduces soil erosion, flooding and siltation.
 21. They contribute to the global O₂/CO₂ balance.
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Inclusion of an argument does not imply that it is necessarily correct, only that it has been used in the past; the arguments have been grouped as they were in the questionnaire to aid comprehension, cf. Fig. 1.

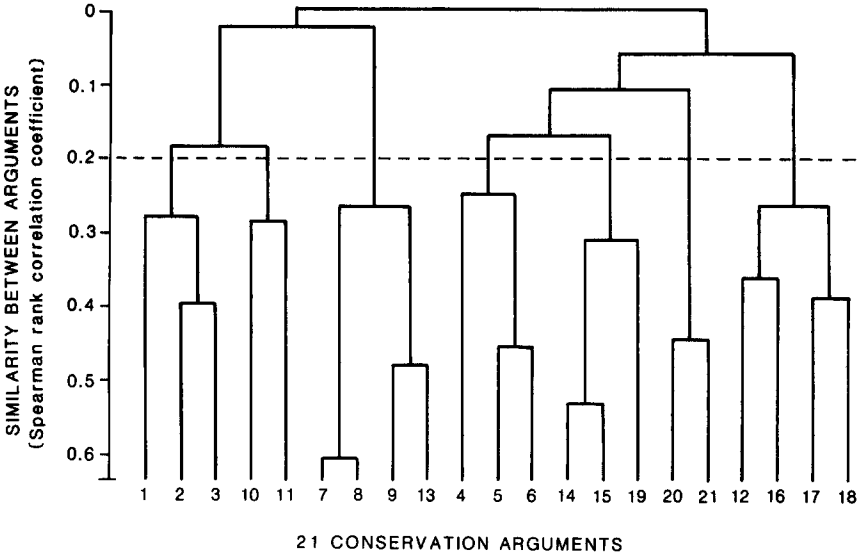
beauty, strangeness, or complexity. How closely do our deeper personal feelings about rain forest match those that we project to others in the name of conservation? Do we use arguments that we believe in; and if not, is it useful to justify our pragmatism as a means of furthering a worthy end?

In an effort to answer these and related questions, a questionnaire was devised which solicited information about 21 different arguments that have been used to justify the conservation of rain forest. The arguments were assembled from various media sources and also from suggestions made on a preliminary questionnaire circulated amongst colleagues in Cambridge, UK. Recipients were asked to rank each argument, first according to their personal beliefs, and secondly as a means of convincing others. Thus each argument was ranked twice on a scale of 1 (of no importance) to 5 (of overriding importance). The 21 arguments are listed in Table 1. Some clearly have points in common, and six major categories of conservation argument were distinguished in the questionnaire: (1) Aesthetic Values, (2) Biological Uniqueness, (3) Economic Management, (4) Education and Research, (5) Moral Responsibilities, and (6) Regulation of the Physical Environment. Recipients were asked to select the most and the least important of these categories, again from two standpoints: according to personal beliefs, and in order to convince others.

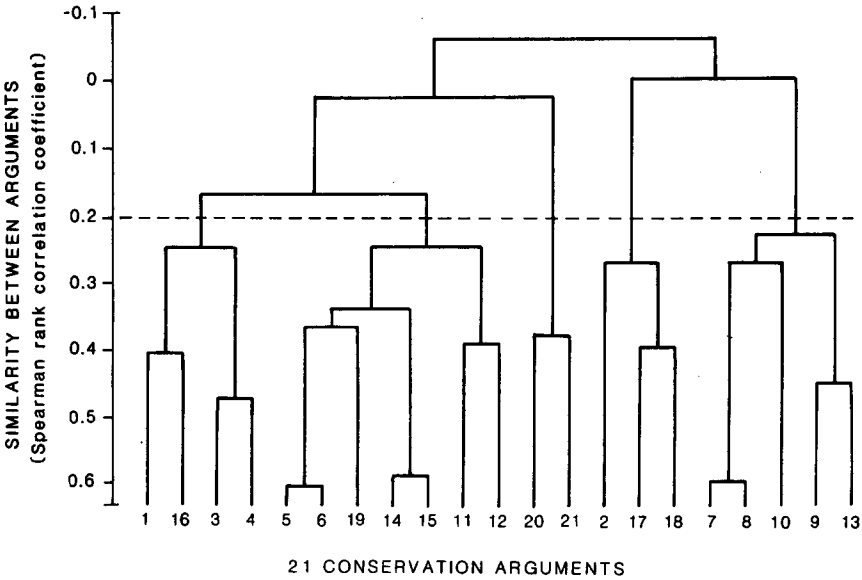
The questionnaire was sent to conservation organizations, wildlife societies, universities and other academic institutions around the world. A number of copies were also circulated among primary schools in and around Cambridge, UK. A total of 300 copies were sent out, and thanks to enthusiastic participation by several respondents, 331 completed questionnaires were returned. Respondents were resident in 22 countries, 16 situated within the tropics and 6 in the temperate zone; between them, they had visited 54 countries with tropical rain forest, including all the major areas (Africa and Madagascar, southern and South East Asia, Indonesia, Australasia, Oceania, Central and South America and the West Indies). The majority of respondents had training in the biological sciences or worked for conservation organisations, but over one-third had no special knowledge of rain forests: they included primary school teachers, students, 'housewives', people in business, and lecturers in the Arts. Of those whose sex was given (205 respondents), 24% were female.

CATEGORIES OF CONSERVATION ARGUMENT

Interrelationships between the 21 conservation arguments were investigated by cluster analysis (Fig. 1). The procedure was first to determine rank correlation coefficients between the scores awarded to each pair of



(a)



(b)

Fig. 1. Results of complete-linkage hierarchical cluster analysis showing the degree of similarity between pairs of the 21 conservation arguments. The hierarchical structure shows arguments that are more similar to one another being tied together by a higher correlation coefficient (see text): (a) scored according to personal beliefs; (b) scored for convincing others. Dashed lines reveal 7 clusters of arguments rated on personal beliefs and 5 clusters rated for convincing others.

arguments, a measure of the similarity of arguments, and then to construct dendograms showing clusters of arguments that were perceived as similar to one-another. Major categories of conservation argument are easily distinguished in the clusters. For example, in Fig. 1b, arguments about economic management with an immediate financial return (7, 8), about economic management with a possible long-term financial return (9, 13), and one argument concerning tourism (10), are all linked together in one cluster. When the purpose of conservation arguments was to convince others, fewer distinct clusters emerged and there were more cross-references between the major categories of argument. Thus, aesthetic values were tied to moral responsibilities, and biological diversity was linked with education and research.

THE EFFICACY OF DIFFERENT ARGUMENTS

Scores awarded to arguments on the grounds of personal beliefs were correlated with those awarded for convincing others (Pearson's $r = 0.780$, d.f. = 20, $p < 0.001$). However, the same argument was likely to be awarded a higher score when rated for personal beliefs (Table 2). The exceptions were four arguments concerned with the economic management of rain forest (7, 8, 10, 13). Most respondents (and this was true for both sexes, across all occupations, and for those with and without first-hand experience of rain forest) thought these arguments were more cogent for convincing others than for convincing themselves. To a less marked degree, the same was true of the only religious argument (18). Thus, one may conclude that there is a tendency to diverge from personally held beliefs when arguments are raised concerning the conservation of rain forest on economic grounds, and a reciprocal tendency to play down arguments used to convince others when they involve aesthetics, ethics, morals, biological diversity or research.

For personal beliefs, arguments connected with biological diversity (5, 6) and regulation of the physical environment (20, 21) were rated highly (they appear in the top third, Table 2). Arguments related to economic management (7, 10), ethics and religion (17, 18) and aesthetics (2, 3) appear in the bottom third. For convincing others, economic management of the forest was rated highly (arguments 8, 9, 13 in top third) together with regulation of the physical environment (20, 21) and biological diversity (5, 6). In the bottom third are aesthetics (2, 3, 4), research (14, 15) and ethics and religion (17, 18). These results are underlined by the ratings given to six major categories of conservation (Table 3). For personal beliefs, Biological Uniqueness was cited as the most important category of conservation by most respondents; for convincing others the equivalent category was

TABLE 2
Average Scores Awarded to Each Conservation Argument (All Respondents Included)

<i>Personal beliefs</i>		<i>Convince others</i>	
<i>Score</i>	<i>Argument no.</i>	<i>Score</i>	<i>Argument no.</i>
4.57	5	4.26	20
4.39	20	3.99	9
4.19	6	3.93	5
4.11	16	3.85	13
4.02	9	3.83	8
3.83	21	3.8	21
3.79	1	3.76	6
3.75	14	3.73	12
3.75	19	3.58	7
3.57	12	3.53	1
3.53	13	3.51	16
3.48	4	3.38	19
3.43	11	3.34	11
3.42	8	3.26	10
3.36	15	2.97	3
3.25	3	2.94	14
2.9	7	2.9	4
2.55	17	2.76	15
2.49	2	2.46	2
2.42	10	2.24	17
1.81	18	2.02	18

Economic Management. Moral Responsibility was most frequently cited as the least important category, both as regards personal beliefs and for convincing others. Aesthetic Value was cited as the most important conservation category by the *fewest* respondents and more than one-quarter of all correspondents believed it to be the *least* important category whether for personal beliefs or for convincing others. This judgement was even more prominent in the returns from the female respondents: aesthetics were selected for the least important category in the personal beliefs of 39%, and for the most important category by only 4%. The low rating given to aesthetics also held true for people with and without first-hand experience of rain forest (Table 3), and for people with different occupations.

Living within the rain forest environment for a year or more affected the category of conservation argument chosen as most (or least) important. More weight was then given to Biological Uniqueness and Economic Management and less to Moral Responsibility (Table 3). For 18 of 21 conservation arguments, those people who had lived in rain forest for a year

TABLE 3
Ratings Given to 6 Major Categories of Conservation Argument

Sample size	Aesthetic value		Biological uniqueness		Economic management		Education & research		Moral responsibility		Regulation of physical environment	
	mi ^a	li ^a	mi	li	mi	li	mi	li	mi	li	mi	li
	%	%	%	%	%	%	%	%	%	%	%	%
63 Those who have not visited tropical rain forest	4.5	23.9	25.4	4.5	6	32.8	10.4	1.5	19.4	26.9	25.4	4.5
	4.5	32.8	6	11.9	32.8	17.9	9	4.4	16.4	26.9	28.4	6
100 Those who have lived in tropical rain forest > 12 months	8.3	29.6	40.7	0.9	10.2	22.2	9.3	0.9	5.5	35.1	16.7	3.7
	1.9	27.8	13	9.3	32.4	10.2	7.4	3.7	6.5	40.7	23.1	3.7

^a mi, most important; li, least important.
^b pb, personal beliefs; co, convincing others.

TABLE 4
Average Questionnaire Scores for Personal Beliefs by Region Containing Country of Residence

Sample size	Region	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
32	Africa	3.46	2.64	3.18	3.26	4.34	4.13	2.64	2.99	3.81	2.37	3.16	3.41	3.51	3.56	2.84	3.94	2.04	1.39	3.17	4.40	3.89
30	C and S America	3.83	2.39	3.25	2.96	4.7	4.17	2.46	3.34	4.20	2.58	3.33	3.5	3.9	4.03	3.93	4.1	2.89	1.43	4	4.26	3.18
20	N America	3.8	2.75	3.33	3.31	4.7	4.45	2.61	3.3	4.4	2.68	3.63	3.7	4	3.84	3.6	4.2	2.10	1.68	3.5	4.25	3.47
56	SE Asia	3.80	2.94	3.5	3.52	4.52	4.15	3.47	3.81	4.12	2.61	3.63	3.72	3.51	3.67	3.38	4.18	2.96	2.4	3.71	4.50	4
189	W Europe	3.83	2.26	3.17	3.60	4.59	4.19	2.89	3.43	3.96	2.31	3.40	3.56	3.44	3.74	3.32	4.11	2.50	1.77	3.83	4.40	3.91
331	Total	3.78	2.49	3.25	3.48	4.57	4.19	2.90	3.42	4.01	2.42	3.43	3.57	3.52	3.75	3.36	4.11	2.54	1.81	3.75	4.39	3.82

or more were less prepared to follow their own convictions, in that their replies to each question for convincing others were less closely correlated to their replies for personal beliefs. Regional differences played only a minor role in shaping the response to the questionnaire. Residents of South East Asia believed more so than others that management of rain forest for a continuous yield of hardwoods, or other natural resources (arguments 7,8), was an important conservation argument (Table 4). Residents of Central and South America believed more than others in the importance of rain forest as a habitat for indigenous forest dwellers (argument 19). Incidentally, the average score of 4.00 given by expatriate residents of this region to argument 19 rose to 4.32 among citizens of this region.

Occupation played a minor role in accounting for differences in the scores awarded according to personal beliefs. However, those furthest from conservation (primary school teachers and those in the group of miscellaneous occupations) gave scores for personal beliefs closely matching those awarded for convincing others, while professional conservationists were less consistent (17 of 21 correlations between scores rated for personal beliefs and scores rated for convincing others were lower than the average for all respondents). The lowest correlations applied to arguments which concern aesthetics and biological diversity (1-6). Possibly, the discrepancy between what some conservationists think and what they argue simply reflects their greater exposure to the realities of politics as it relates to land-use. The question remains as to whether it is useful to continue a dichotomy between personal beliefs and what one thinks others want to hear.

DIFFERENT PERSPECTIVES

In additional comments attached to some questionnaires, two opposing viewpoints emerged about how best to convince others over the conservation of rain forest. One group advocated exclusive use of the same arguments that score highly for personal beliefs. It was recommended that 'only honest arguments work' and that 'the message that works very often is the one you are genuinely enthusiastic about'. The other group felt that every argument should be tailored to the context, irrespective of personal beliefs. They reasoned that any strategy which presents the conservationist's goal in an attractive light to the recipient is valid. The tools employed are very varied, as a glance through any text concerning rain forest resources and their conservation will reveal (Burkill, 1966; Caufield, 1982, 1985; Huxley, 1984; Myers, 1984; Westoby, 1987). This second approach was probably accepted by the majority of respondents.

However, some advocates of the first point of view felt that the use of

arguments other than those personally believed in could be counter-productive in the long term. For instance, an economic argument that was used solely to convince others (involving, say, a sustained yield of multiple forest products) might fail if a more profitable system of land use involving a monoculture could be devised, or if it were suspected that valuable minerals were present in the area, or if an increase in demand for electricity created a powerful lobby for dam construction and the generation of hydroelectricity (Collar, 1986). Carefully terraced, agricultural development, along the lines practised in some of the moister parts of China and South East Asia, can provide a high yield of crops as well as protection of the watershed (except perhaps on the steepest gradients). Thus, conservation arguments constructed to convince others and based exclusively on the need to preserve the physical environment could also rebound under certain conditions.

So is it dishonest to use an argument that is not held with personal conviction? It could be considered dishonest to pretend that a given set of arguments coincided with one's personal convictions. In addition, dishonesty by omission may occur if one argues a case for conservation but withholds personal convictions. The latter might be withheld if it is felt that ethical and moral issues are too deeply personal to be open to logical argument, reasoning and persuasion. Usually, it is not difficult to find other, opportunistic arguments that can more easily be supported by facts. The paradox is that deeply held beliefs which carry the full force of personal conviction and commitment can be immensely persuasive. A more open approach about strongly held personal beliefs might therefore strengthen the case put for long-term conservation.

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