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Biocultural diversity in Albania, Macedonia and Kosovo

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Abstract

Albania, Macedonia, and Kosovo despite being small countries, are notable for their rich biological diversity, as it is also shown from their index of the biological diversity (BD-RICH) respectively 0.633, 0.636 and 0.602. The relatively positive value of their index of biocultural diversity (IBCD-RICH) is the result of their high biodiversity. All of the three countries have the highest index of the flora diversity highest compared to mammals and birds. The values of the diversity index of 0.5 for mammals and birds (MD-AREA), diversity index of plants (PD-AREA) and the index of biologic diversity (BD-AREA) show that these countries are much more diverse compared to the expected values in relation to their surface.

***Key words**: bicultural diversity, biodiversity index, sustainability.*

Abstrakt

Shqipëria, Maqedonia edhe Kosova edhe pse vende të vogla, shquhen për diversitet biologjik të pasur, siç e tregon edhe madhësia e indeksit të diversitetit biologjik (BD-RICH) të tyre, i cili është respektivisht 0.633, 0.636 dhe 0.602. Vlera relativisht e mirë e Indeksit të diversitetit biokulturor (IBCD-RICH) të tyre është rrjedhojë e biodiversitetit të lartë. Të tre vendet kanë indeksin e diversitetit të florës më të lartë se të gjitarëve dhe shpendëve. Vlerat

mbi 0.5 të indeksit të diversitetit të gjitarëve dhe shpendëve (MD-AREA), indeksit të diversitetit të bimëve (PD-AREA) dhe indeksit të diversitetit biologjik (BD-AREA) tregojnë se këto vende janë më shumë diverse se vlera e pritur për sipërfaqen e tyre

Апстракт

Албанија, Македонија и Косово иако се мали земји се одликуваат со богат биолошки диверзитет (разноликост), факт што го покажува високиот индекс на биолошки диверзитет (BD-RICH), кој изнесува: 0,633, 0,636 и 0,602. Релативно високиот индекс на биокултурниот диверзитет (BD-RICH) најверојатно е резултат на висок биодиверзитет. Кај сите три земји се забележува повисок индекс на диверзитет на флората во споредба со цицачите и птиците. Вредностите над 0,5 на индексот на диверзитет на цицачите и птиците (MD-AREA), индексот на диверзитет на растенијата (PD-AREA) и индексот на биолошкиот диверзитет (BD-RICH) укажуваат на фактот дека овие земји се многу подиверзитетни во однос на очекуваните резултати имајќи ја предвид нивната големина (површина).

Клучни зборови: биокултурен диверзитет, индекс на биодиверзитет.

Introduction

The diversity of life is made up not only of the diversity of plants and animal species, habitats, and ecosystems found on the planet, but also of the diversity of human cultures and languages. These diversities do not exist in separate and parallel realms, but rather they interact with and affect one another in complex ways (Maffi, 2007a). Cultural diversity is as necessary for humankind as biodiversity is for nature (UNESCO, 2002). Cultural diversity - as a source of innovation, creativity and exchange - is humanity's guarantee for a mutually enriching and sustainable future (UNESCO & UNEP, 2003). If the 1980s might be remembered as the decade of biodiversity—in which the term biodiversity was coined to call attention to the massive, human-made extinction crisis threatening the diversity of life in nature - then the 1990s might be dubbed the decade of biocultural diversity - when the concept of an intimate link between biological, cultural, and linguistic diversity was put forth and its implications for life in both nature and culture began to be explored. By the mid-2000s, a small but significant body of literature on biocultural (or, in a less widespread version, biolinguistic) diversity has accumulated, and a related field of both scholarly research and practical applications is emerging (Maffi, 2005).

The concept of biocultural diversity has emerged during the last decade as a way of representing the interlinkages among, and interdependence of, all forms of diversity of life: biological, cultural and linguistic (Maffi, 2007b), as an area of transdisciplinary research concerned with investigating the links between the world's cultural and biological diversity (UNESCO, 2008; Maffi, 2005). A new field of biocultural diversity research has developed that explores these connections at global, regional and local scales (Maffi, 2007b). The label "biocultural diversity" is actually the short form for "biocultural, cultural and linguistic diversity". Language plays an important role in communicating and transmitting cultural

values, traditional knowledge and practices, and mediates therefore interactions between humans and their environment. Consequently, it can be seen as the third pillar of the biocultural concept (Maffi, 2007a; Frank, 2011). Biocultural diversity (BCD) is the total variety exhibited by the world's natural and cultural systems. It may be thought of as the sum total of the world's differences, no matter what their origin. It includes biological diversity at all its levels, from genes to populations to species to ecosystems; cultural diversity in all its manifestations (including linguistic diversity), ranging from individual ideas to entire cultures; the abiotic or geophysical diversity of the earth, including that of its landforms and geological processes, meteorology, and all other inorganic components and processes (e.g., chemical regimes) that provide the setting for life; and, importantly, the interactions among all of these (Harmon & Loh, 2004; Loh & Harmon 2005).

For the assessment of BCD used the Index of Biocultural Diversity (IBCD). The IBCD measures the status of and trends in BCD on a country-by-country basis, based on five indicators: languages, religions, and ethnic groups (for cultural diversity), and bird/mammal species and plant species (for biological diversity) (Harmon & Loh, 2004). The IBCD features three components: a biocultural diversity richness component, which is the sheer aggregated measure of a country's richness in cultural and biological diversity; an areal component, which adjusts the indicators for a country's land area and thus measures biocultural diversity relative to the country's physical extent; and a population component, which adjusts the indicators for a country's human population and thus measures biocultural diversity in relation to a country's population size (Maffi, 2005). BCD-RICH is the most straightforward measure of biocultural diversity, but BCD-AREA and BCD-POP are equally important components of the IBCD because they highlight countries that are small in area and/or population size but which have relatively high biocultural diversity (or vice versa) (Harmon & Loh, 2004; Loh & Harmon 2005).

Albania, Macedonia and Kosovo are relatively small countries where the cultural and biological diversity are not only part of their national patrimony but also of the European biocultural inheritance. During the recent years these countries are having deep social, economical and cultural transformations, essential transformations through the developing globalization. One of the negative aspects of this globalization is the swallowing up of many cultures and traditions.

The purpose of this study is to evidence the biocultural diversity wealth of these countries through the definition of the values of BCD-RICH and BCD-AREA, not only to evidence their biological and cultural diversity, but also for their conservation and the sustainable development of these countries.

Materials and methods

For all calculations has using the procedure given by Harmon & Loh (2004) and Loh & Harmon (2005). The IBCD gives equal weight to cultural and biological diversity. A country's IBCD value therefore is calculated as the average of its cultural diversity (CD) and its biodiversity (BD), or:

$$IBCD = \frac{CD + BD}{2}$$

In measuring a country's cultural diversity (CD), equal weight is given to linguistic, religious, and ethnic diversity. Therefore CD is calculated as the average of a country's language diversity (LD), religion diversity (RD), and ethnic group diversity (ED):

$$CD = \frac{LD + RD + ED}{3}$$

In measuring biodiversity (BD), equal weight is given to animal species diversity (using birds and mammals as a proxy for all animal species, marine mammals are excluded from the analysis) and plant species diversity. Therefore BD is calculated as the average of a country's bird and mammal species diversity (MD), and plant species diversity (PD):

$$BD = \frac{MD + PD}{2}$$

To derive country scores for each of the five component indicators compared each country's richness value with the global value. For example, staying with language diversity, the index is calculated as the log of the number of languages spoken in a country divided by the log of the number of languages spoken worldwide. According **Lewis (2009)**, the total number of languages currently spoken is 6909 (log 6909 = 3.84). Hence the formula used is:

$$\text{XX-RICH} = \log N_i / \log N_{world}$$

where: XX = LD, RD, ED, MD, or PD;
Ni = number of languages, religions, ethnic groups, or species in country i;
Nworld = the actual observed number of languages, religions, ethnic groups, or species in the world.

As sources data used: languages (**Lewis, 2009), r**eligions (Harmon & Loh, 2004; ICG, 2001), ethic groups (UNEP, 2007; Harmon & Loh, 2004), plant species (Vangjeli etj. 2000; SIDA, 2000; Mustafa, 2011); bird/mammal species (MEFWA, 2010; SIDA, 2000; USAID/Kosovo, 2003).

Since the studied countries are small states, was calculated also a second component of the IBCD adjusts the BCD value for each country by accounting for its land area, areal biocultural diversity index (IBD - AREA). The expected diversity of a country is derived from the species-area relationship, which comes from ecological theory:

$$\log S = c + z \log A$$

where: S = number of species; A = area; and c and z are constants that can be derived by observation.

The formula simply states that the log of the number of species presents in a country or territory increases in proportion with the log of the area of the country or territory. Because the distributions of the five indicators against land area size are similar, the same formula was applied to indicators of cultural diversity, hence:

$$\text{expected } \log N_i = c + z \log A_i$$

where N_i = number of languages, religions, ethnic groups, or species in country i; Ai = area of country i: and c and z are constants.

To find the values of *c* and *z* for each of the indicators used in the analysis, was scatter-plotted log N_i against log A_i for all countries, and drew the best- fit straight line through the scatter; *z* is the slope of the line and *c* is the point where it intersects the y-axis. To calculate

the deviation of each country from its expected value, simply was subtracted the expected log N_i value from the observed log N_i value.

Deviation from expected value = log N_i – expected log N_i
or log N_i – (c + z log A_i)

This gives a series of values for each country where a score of 0 means that the country is exactly as diverse as one would expect based on its area, a score of 1 means it is ten times more diverse, a score of 2 means it is a hundred times more diverse, a score of -1 means it is ten times less diverse, a score of -2 a hundred times less, and so on.

The formula used to calculate a country's area-adjusted diversity value for each of the five indicators is:

$$XX - AREA = \frac{D_i - D_{\min}}{D_{\max} - D_{\min}}$$

where: D_i = observed log N_i – expected log N_i;
D_{min} = a value below that of the least diverse country;
$D_{max} = D_{world}$, the actual observed value for the entire world.

The index is calculated such that the global, or maximum, value is equal to 1.0, the minimum value is zero and the average or typical value is 0.5 (meaning no more or less diverse than expected given a country's are). The global value for each of the five measures is also the maximum value, or, put another way, the world as a whole is more diverse than any country, even after adjusting for land area.

Results and discussion

The data of the tab. 1 show that about the cultural diversity (CD-RICH) and its components; language diversity (LD-RICH), religious diversity (RD-RICH) and ethnic groups diversity (ED-RICH), the three countries have relatively low indexes. Macedonia has the highest CD-RICH 0.260, compared to 0.231 of Albania and 0.216 of Kosovo, because of the higher value of the ED-RICH.

Table 1. The biocultural diversity richness index (IBCD-RICH)

Country	Total no. Languages, L	Language diversity index, LD-RICH	Total no. of religions , R	Religion diversity index, RD-RICH	No. of Ethnic groups , E	Ethnic group diversity index, ED-RICH	ICultural Diversity Index, CD-RICH	Total no. bird and mammals species, S	Birds and mammals diversity index, MD-RICH	Total no. plant species , S	Plants diversity index, PD-RICH	Biological Diversity Index, BD-RICH	Index of Biocultural Diversity, IBCD-RICH
WORLD/ theoretical max value	6909	1.000	10000	1.000	12583	1.000	1.000	15488	1.000	282842	1.000	1.000	1.000
Albania	7	0.220	7	0.211	12	0.263	0.231	403	0.622	3250	0.644	0.633	0.432

Macedonia	9	0.248	6	0.195	24	0.337	0.260	408	0.623	3500	0.650	0.636	0.448
Kosovo	7	0.220	6	0.195	9	0.233	0.216	271	0.581	2500	0.623	0.602	0.409

Albania is distinguished for a high diversity of genetic resources, species and ecosystems (MEFWA, 2010), it is a small "genetic oasis" (Vangjeli etj. 2000; Damo & Icka, 2010). Macedonia is considered one of the leading European biodiversity hotspots. A unique set of geologic, morphological, and climatic factors have been combined to make it one of the most valuable areas of European biodiversity (USAID, 2010). It has an extremely rich biodiversity (UNEP, 2001). Kosovo is extra ordinary rich with plant species, considering its relatively small surface (MESP, 2010; USAID, 2003). Kosovo's location in the Balkan Peninsula puts it within the most rich of species place in Europe and in a region especially abundant in endemic species, nowhere else found (USAID, 2009). These countries are well known for their rich and varied flora and fauna (SIDA, 2000). The biological diversity index (BD-RICH) of the three countries (Tab. 1) confirms their high biological diversity. Macedonia has the highest BD-RICH (0.636), and Kosovo the lowest (0.602), in the midst stands Albania (0.633). The same order is applied also for the index of the diversity of plants and animals. The tree countries have the flora diversity index higher than the animal's index.

The relatively good value of the IBCD- RICH comes out of the very high biological diversity compared to the cultural diversity. For this index Macedonia has the highest value (0.448), Kosovo the lowest (0.409), and Albania stands in the middle (0.432).

The data of the tab. 2, show that Albania, Macedonia and Kosovo are much more diverse compared to their expected values based on their country surface. The deviations from the expected values show that these countries are 2-3 times more diverse for mammals and birds, and also for the plants based on their country surface. The data of MD-AREA, PD-AREA and BD-AREA are above the average value of 0.5, which means that these countries are much more diverse that the expected values based on their country surface. Macedonia has the highest expected biological diversity (0.695), Kosovo the lowest for mammals and birds (0.626) and Albania the lowest for the birds (0.695).

Table 2. The areal biocultural diversity index (BD-AREA)

Country	Area (A), km^2	Deviation from expected value for mammals and birds (D)	Deviation from expected value for plants (D)	Bird & mammal diversity index MD-AREA	Plant diversity index PD-AREA	Biodiversity index BD-AREA
World	136605342	0.69	0.95	1.000	1.000	1.000
Albania	28748	0.30	0.24	0.661	0.695	0.678
Kosovo	10887	0.26	0.27	0.626	0.708	0.667
Macedonia	25713	0.32	0.28	0.678	0.712	0.695
Minimal value	1000	-0.46	-1.38	0.000	0.000	0.000

The index of biocultural diversity has both theoretical and practical implications. For researches of the interchanges between biological and cultural diversity, it provides a general context through which can prepare comparative analyses. For policymaker and donor organization, it is a potential framework for guiding strategic investments in biocultural diversity conservation. For the general public, the index serves as a reminder that no matter where a country ranks, its biocultural diversity is an important part of the global complement (Loh & Harmon, 2005). The biocultural diversity is a fact. We can observe it, explain it, we

can lose it, preserve it or even enrich it. Biocultural diversity, thus, has an obviously descriptive dimension. But at the same time, we value biocultural diversity: we consider diversity to be good, more diversity to be better than less. This value of biocultural diversity has normative consequences: Loss of diversity calls us for action. Biocultural diversity, one might say, not only "is", it also "shall be" (Eser, 2009).

According to MESP (2010), in Kosovo is missing the national biodiversity indicators, it creates obstacles to the use of data and addressing the issues of national priority. The indices MD-RICH, PD-RICH and BD-RICH, used in this paper, can be used very well for this purpose not only in Kosovo but also in Albania and Macedonia, where these indices are not been used before. Such indicators can be used as means through which can be handled the evaluation of biodiversity and its threats. They can assist to define and monitor the national policies of the biodiversity, environment and sustainable development and to report the implementation of such international agreements like the Convention for the Biodiversity etc.

Like most of the countries the three countries of this study are facing the problem of biodiversity vanishing. To overcome this situation, through possible means are the studies about the biocultural diversity and ethnobotanical studies. According to Maffi (2005), through biocultural diversity studies can be collected important data for assessments of the common threats to biodiversity, cultural diversity, and linguistic diversity and also the sociocultural and environmental consequences of loss of these interconnected diversities. Ethnobotany has an important role in the conservation of nature, culture, and, especially, the biological diversity and the diversity of traditional human cultures in the world (Abbasi et al., 2012). Ethnobotany is first vital key to preserve the diversity of plants as well as to understand and interpret the knowledge through which we are and will be, enabled to deal with them effectively and sustainably throughout the world (Prance et al., 2007). We cannot understand and conserve the natural environment unless we understand the human cultures that make it up. (UNESCO & UNEP, 2003).

It is the right moment to start the missing studies about the biocultural diversity in Albania, Kosovo and Macedonia. The undertaken of the common biocultural and ethno-botanic studies can be important elements to the sustainable development of these countries. The documentation of traditional knowledge about the collected plants in different communities gains importance, because the plant are the bases from which is depended the rest of the biodiversity, its preservation is very important for the conservation and the saving of the bio-culture of the communities or environments. The erosion of the traditional knowledge about spontaneous plants and the serious threats on biodiversity makes more necessary the studies about the biocultural diversity. The territorial vicinity is a sociable factor, while the different cultural and social characteristics of the human communities distinguish us; meantime they impact the biodiversity conservation and the utilization of the genetic resources.

Conclusion

The data of the study show that Albania, Macedonia and Kosovo have biologic diversity index (BD-RICH) higher, which impacts to the relatively better value of the biocultural diversity index (ICBD-RICH). Macedonia has the highest biodiversity, Kosovo the lowest, and Albania is in the midst. The biodiversity index corrected according the surface shows that these countries are much more diverse than the expected value based on their surface. Macedonia has the highest biological diversity based on the surface, Kosovo the lowest for mammals and birds, Albania the lowest for plants.

The studies about the biocultural diversity as a new scientific researches and practical applications field are necessary to be held also in Albania, Kosovo and Macedonia. The information obtained from the compound components of the biocultural diversity (MD-RICH, PD-RICH and BD-RICH) can be successfully utilized for the biodiversity evaluation and its threats, to define and monitor the national and regional politics about the biodiversity, the environment and the sustainable development.

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