

Advantages of Ecosystem Services to Human Being

Nigam Rani ^{a#} and Sheela Sangwan ^{a*^o}

^a I.C. College of Home Science, CCS HAU, HISAR (125004), India.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/CJAST/2022/v41i1731730

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/85164>

Review Article

Received 12 February 2022

Accepted 01 April 2022

Published 06 June 2022

ABSTRACT

The review concentrating on the direct and indirect connection between elements of ecosystems services and human well-being and effect of disharmony between ecosystem and human well-being. Resources found from ecosystem are the benefits for human being and other habitants of environment. These consist like foodstuff, wood, and fiber for clothes. The human species, while buffered against environmental changes by culture and technology, is fundamentally dependent on the flow of ecosystem services. Association between human well being and ecosystem became a growing interest for researchers from past few decades. Ecosystem is a life support system for human species and all forms of life and viewed in the context of the health of the earth and its natural process of ecosystems. Ecosystem positively and negatively affects cognitive, emotional, social behavior, and physical health of an individual. Today it is a very big challenge for a community/society to maintain a balance in between functioning of ecosystems and use of natural resources. But in the name of economic growth, humans pay more stress on the environment by disturbing its natural functioning.

Keywords: Ecosystem; human well being; support system; natural resources; environmental stress.

1. INTRODUCTION

A broad perceptive of the association between human beings and the natural environment has

been of growing interest to researchers or scientists over the past few decades. This is evident in the large number of research exploring the effects of nature contact and feelings of

[#] Senior Research fellow;

^o Professor;

*Corresponding author: E-mail: sangwan.sheela@yahoo.com;

association to nature on health and wellbeing of human being, and environmental behaviors and attitudes. Greater feelings of correlation with the environment are seen to promote physical health, and psychological wellbeing of individual as well as community including mood state, and community cohesion [1,2]. Carrus et al. [3] “revealed that contact with environment positively affect cognitive, emotional, social behavior, and physical health of an individual. Better physical health and psychological wellbeing has also been connected with feelings of emotional connection to natural world” [4-6].

“Ecosystem is a life support system for human species and all forms of life. Human health (physical and mental) is viewed in the context of the health of the earth and its natural process of ecosystems” [7,8]. “Natural ecosystem provides life support services to human as well as other species to make their life possible. Human and other biology has a basic need for water, food, fresh air and shelters etc. Human species need health benefits which are derived from complement of other species, intact watersheds, climate change system, genetic diversity and biodiversities. All of these services also contribute to a good quality of life by influencing the well-being of an individual and society. Natural ecosystems make human civilization possible on earth. Unfortunately most of the human beings believe that all of these services which provided by mother nature are valueless and had no traditional economic value” [9,10]. “All human being as community directly and indirectly pay significantly for their loss through infrastructure and other policy costs for e.g. watershed treatment plants, construction cost, losses in soil fertility, increased illness and significant decrease in basic human well-being. Decisions made by human and their constituents have some kind of adverse effect on the amount and quality of services provided by the ecosystems. Today there is a need to emphasize the interrelated aspects of human well-being and the functioning of ecosystems whether these are natural or human altered” [9]. Life of every species and economy is dependent on natural resources which are provided by natural ecosystems [11]. “Today it is a very big challenge for a community/society to maintain a balance in between functioning of ecosystems and use of natural resources. Natural resources like goods like food, water, fiber, timber, and other supplies have significant substantial and insubstantial value. But in the name of economic growth,

humans pay more stress on the environment by disturbing its natural functioning. Human being have changed different ecosystems, coastal ecosystem” [12] “wetland resources [13] environment loss and tropic crumple” [14] pollinator declines [15] loss of soil quality and agricultural production [16] extremely in the last several decades [17] “in order to meet increasing demands for freshwater, foods, shelters, means of transportation and fuel. These changes became necessity for the society to meet the basic needs of world’s population but these changes have caused permanent losses in ecosystem structure and function for e.g., diversity loss, loss of ecosystem capacity for service generation as well as our perception of place, comfort and well-being” [18,19].

Different environmental factors can influence human health in many ways including social, emotional, economic, psychological, physiological, behavioral and genetic foundation [20]. It is essential to notice that, in several cases these determinants of health could be more important than the effects of nature contact on specific outcomes. Basic environmental factors determining levels of mental illness and health but these are not limited to marked demographic shifts in the world’s population, social shifts to increased stress and being alone, physical activities shifts to more inactive lifestyles, and certain aspects of development of urbanization leads to a loss of many areas for experiencing nature closely on a regular basis for some people [21]. “Current lifestyles are associated with decreased routine nature contact in urban living [22]. Metro cities are centers of employment opportunities, wealth, access to good education, health and medical services and cultural improvement. These aspects of life may support to mental health” [23]. “Though, these can also be connected with low access to natural world, particularly for those who are living within economically underprivileged urban areas” [24]. “Some other factors contributing to a decrease in environmental contact include supposed barriers such as fear” [25] “which leads to increased time spent inside the house and on screens, and reduce the participation in outdoor recreation activities. In recent decades, researchers in public health and health economics have intensified experiential and experimental research on the role of ecosystems and the environment to promote human well-being, including mental health” [26-28].

2. ECOSYSTEMS SERVICES AND HUMAN BEING

“Human health is directly depends on ecosystem services. Ecosystems’ natural services are co-produced by the interactions between nature and human being” [29,30]. “Different mechanisms contribute benefits directly to different domains of human well-being, for example, physical and mental health” [31,32]. Ecosystem provides food, fresh water after natural purification, and disease regulations. These are very essential in decreasing child mortality, improvement in maternal health, and fighting against different diseases. Changes in ecosystems can influence the profusion of human pathogens which leads to outbreaks of diseases such as dengue, malaria, diarrhea and cholera and the appearance of new diseases like COVID-19. Natural process of ecosystems protects human being from natural hazards. People live in areas that are open to extreme environmental events such as floods, harsh storms, forest fires, and droughts. The changes in ecosystems affect the likelihood and the severity of extreme events by regulating global and regional climates. Healthy and natural process of ecosystems can also reduce the impact of extreme environmental events by regulating floods or protecting coastal areas from storms and hurricanes. Natural disasters need investments in natural disaster protection which impose long-lasting stress on social, ecological and financial systems that contribute in human well-being. This became a challenge for societies to find ways to protect the socio-ecological systems on which they depend in the face of constantly changing ecosystem and natural hazard threats. Climate change regulates the quality, quantity and timing of ecosystem services such as fresh water, food and fresh air. Changes in ecosystems create vulnerabilities for human being and sectors that depend on the natural services. Different types of vegetation provide climate regulating services by capturing carbon dioxide, heat and other environmental pollutions from the environment. Ecosystem services such as water and erosion regulation, natural hazard protection, and pest control can help protect communities from climate-induced events such as increased floods, droughts, and pest outbreaks.

Natural ecosystems fulfill the need of water by regulating the water cycle, filtering impurities of water and regulating the erosion of soil from the upper layer of earth in to water. Increase in population, trade and industry development lead

to rapid need for water resource development, to meet these needs many natural functioning systems have been replaced with highly modified and human-engineered systems. Needs for irrigation, domestic water, power, and transport are met at the expense of rivers, lakes, and wetlands that offer recreation, scenic values, and the maintenance of fisheries, biodiversity, and long-term water cycling. Modified human engineered systems adversely affect the natural water cycle [33,34]. Ecosystems are very important for food production; due to massive increase in growth of population there is stress to increase agricultural production in the short time at the cost of ecosystems’ long-term power for food production. Excessive use of natural resources to satisfy needs of increased population for food and other services can wear down the ecosystems by soil degradation, water depletion, and contamination; fall down of fisheries, or loss of biodiversity. Provide habitats for a variety of wildlife. Biodiversity matters for human health. Micro-variables such as birds, plants, wildlife, and native species create a bond between people and natural places [35,36]. “Billion of poor people live in rural areas. They directly depend on nature for their livelihoods and well-being: food and agricultural production, accessibility of freshwater, and protection from natural hazards. Rural population in developing countries is particularly susceptible to environmental change due to their direct reliance on ecosystems and their natural services”. “Dreadful conditions of these natural services can mean malnourishments, hunger and death. Reserves in ecosystems natural service preservation and restoration can improve rural livelihoods and be a stepping stone to eliminate poverty of rural people. Sustainable Development Goals” [37,38]. “highlight the linked challenge of maintaining ecosystem integrity while addressing poverty and inequality. This challenge requires institutions, behaviours and governance systems that support both benefits from ecosystems to people, and the stewardship of those ecosystems” [39].

3. CONCLUSION

It is very difficult to develop useful and informative relationships between ecosystem services and human well-being due to lack of continuously accessible data to show a fundamental relationship between natural services and human well-being. Keeping in view these points, there is an urgent need to combining natural/environmental sciences and

social sciences data, approaches to research studies and interpretations. Even inside these disciplines, the combination of data representing indicators to create indices or demonstrate connections is highly debatable. Some scientists, researchers and policy makers recommend that summary of assessment tools (e.g., models, indices, statistical assessments) not have meaningful explanation and have little value in the actual world [40,41]. Some policy makers argue that the real world is a multifaceted interaction of economic, social, and ecological activities where focus on single issues is inadequate to represent truth [42,43]. No matter who we are, or where we live, well-being of human completely depends on the natural process of ecosystems function [44,45]. Community and human well-being is essential for a holistic policy view that minimizes accidental consequences. The research described in this chapter provides a deep understanding on ecosystem and its importance in human well-being, but important work still needs to be accomplished [46,47]. The complexity of the relationship between natural services and human well-being raise an urgent need to do further researches with the inter-disciplinary sciences which will bring scientists together from different fields like biologists, social scientists, ecologists, economists, and environmental specialists. Primary goal of these researches is the development of an evaluation system mainly based on human well-being and well-being enhancement through alteration in the use of natural resources [48,49]. It is further expected by the inter-disciplinary team researchers to describe these needs to construct a stronger science for real world and construct a stronger socio-ecological science that reflects the fact that natural ecosystems and human well-being directly or indirectly affect each other.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Maas J, Verheij RA, de Vries S, Spreeuwenberg P, Schellevis FG, Groenewegen PP. Morbidity is related to a green living environment. *J. Epidemiol. Commun. Health.* 2009;63:967–973. DOI: 10.1136/jech.2008.079038.
2. Shanahan DF, Bush R, Gaston KJ, Lin BB, Dean J, Barber E, et al. Health benefits from nature experiences depend on dose. *Sci. Rep.* 2016;6:1–10. DOI: 10.1038/srep28551.
3. Carrus G, Passiatore Y, Pirchio S, Scopelliti M. Contact with nature in educational settings might help cognitive functioning and promote positive social behavior. *Psychology.* 2015;6:191–212. DOI: 10.1080/21711976.2015.1026079.
4. Brown KW, Kasser T. Are psychological and ecological well-being compatible? The role of values, mindfulness, and lifestyle. *Soc. Indic. Res.* 2005;74:349–368. DOI: 10.1007/s11205-004-8207-8.
5. Nisbet EK, Zelenski JM, Murphy SA. Happiness is in our nature: exploring nature relatedness as a contributor to subjective well-being. *J. Happiness Stud.* 2011;12:303. DOI: 10.1007/s10902-010-9197-7
6. Martyn P, Brymer E. The relationship between nature relatedness and anxiety. *J. Health Psychol.* 2016;21:1436–1445. DOI: 10.1177/1359105314555169
7. Swimme B, Berry T. *The Universe Story: From the Primordial Flaring Forth to the Ecozoic Era – A Celebration of the Unfolding of the Cosmos.* San Francisco, CA: Harper; 1994.
8. Clinebell HJ. *Ecotherapy: Healing Ourselves, Healing the Earth.* New York, NY: Haworth Press; 1996.
9. Johnston JM, Jesus CR, Harwell M, Jackson C, Myer M, Seeteram N, Williams K, Yee S, Hoffman J. *Valuing Community Benefits of Final Ecosystem Goods and Services: Human Health and Ethnographic Approaches as Complements to Economic Valuation.* EPA/R-600/R-17/309. Washington, D.C.: US Environmental Protection Agency; 2017.
10. Jordan SJ, Hayes SE, Yoskowitz D, Smith LM, Summers JK, Russell M, Benson WH. Accounting for natural resources and environmental sustainability: Linking ecosystem services to human well-being. *Environmental Science and Technology.* 2010;44:1530-1536.
11. Daily GC. *Nature's Services: Societal Dependence on Natural Ecosystems.* Washington, DC: Island Press. 1997;391.
12. Worm B, Barbier EB, Beaumont N, Duffy JE, Folke C, Halpern BS, Jackson JBC, Lotze HK, Licheli F, Palumbi SR, Sala E, Selkoe KA, Stachowicz JJ, Watson R. Impacts of biodiversity loss on ocean

- ecosystem services. *Science*. 2005;314:787-790.
13. Zedler JB, Kercher S. Wetland resources: Status, trends, ecosystem services, and restorability. *Annual Review of Environmental Resources*. 2005;30:39-74.
 14. Dobson A, Lodge D, Alder J, Cumming GS, Keymer, McGlade J, Mooney H, Rusak JA, Sala O, Wolters V, Wall D, Winfree R, Xenopoulos MA. Habitat loss, trophic collapse, and the decline of ecosystem services. *Ecology*. 2006;87:1915-1924.
 15. Potts SG, Biesmeijer JC, Kremen C, Neumann P, Schweiger O, Kunin WE. Global pollinators declines: Trends, impacts and drivers. *Trends in Ecology and Evolution*. 2010;25:345-352.
 16. Sandhu HS, Wratten SD, Cullen R. Organic agriculture and ecosystem services. *Environmental Science & Policy*; 2012.
 17. Daily GC, Polasky S, Goldstein J, Kareiva PM, Mooney HA, Pejchar L, Ricketts TH, Salzman J, Shallenberger R. Ecosystem services in decision making: Time to deliver. *Frontiers in Ecology and the Environment*. 2009;7:21028.
 18. Chawla L. *In the First Country of Places: Nature, Poetry, and Childhood Memory*. Albany, NY: State University of New York Press. 1994;234.
 19. Summers JK, Smith LM, Case JL, Linthurst RA. A review of the elements of human well-being with an emphasis on the contribution of ecosystem services. *Ambio*. 2012;41:327-340.
 20. Meyer A. Lindenberg Social neuroscience and mechanisms of risk for mental disorders. *World Psychiatry*. 2014;13:143–144.
 21. Cox DTC, Hudson HL, Shanahan DF, Fuller RA, Gaston KJ. The rarity of direct experiences of nature in an urban population. *Landsc. Urban Plan*. 2017;160:79–84.
 22. Glaeser E. *Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier* (Penguin Press1); 2011.
 23. Schwarz K, Fragkias M, Boone CG, Zhou W, McHale M, Grove JM, O’Neil-Dunne J, McFadden JP, Buckley GL, Childers D, Ogden L, Pincetl S, Pataki D, Whitmer A, Cadenasso ML. Trees grow on money: Urban tree canopy cover and environmental justice. *Plos One*. 2015;10:e0122051.
 24. Skar M, Krogh E. Changes in children’s nature-based experiences near home: From spontaneous play to adult-controlled, planned and organised activities. *Child. Geogr*. 2009;7:339–354.
 25. Hartig T, Kahn PH. Jr. Living in cities, naturally. *Science*. 2016;352:938–940.
 26. Bosch Van Den MA, Depledge MH. Healthy people with nature in mind. *BMC Public Health*. 2015;15:1232.
 27. Frumkin H, Bratman GN, Breslow SJ, Cochran B, Kahn PH Jr., Lawler JJ, Levin PS, Tandon PS, Varanasi U, Wolf KL, Wood, Nature contact and human health: A research agenda. *Environ. Health Perspect*. 2017;125:075001.
 28. Hartig T, Van Den Berg AE, Hagerhall CM, Tomalak M, Bauer N, Hansmann R, Ojala A, Syngollitou E, Carrus G, Herzele AV, Bell S, Podesta MTC, Waaseth G. Health benefits of nature experience: Psychological, in Forests, Trees, and Human Health, K. Nilsson, M. Sangster, C. Gallis, T. Hartig, S. de Vries, K. Seeland, J. Schipperijn, Eds. (Springer). 2011; 127–168.
 29. Palomo I, Felipe-Lucia MR, Bennett EM, Martín-López B, Pascual U. Disentangling the pathways and effects of ecosystem service co-production. *Advances in Ecological Research*. 2016;54:245–283. Available: <https://doi.org/10.1016/bs.aecr.2015.09.003>.
 30. Reyers B, Biggs R, Cumming GS, Elmqvist T, Hejnowicz AP, Polasky S. Getting the measure of ecosystem services: a social–ecological approach. *Frontiers in Ecology and the Environment*. 2013;11(5):268–273. Available: <https://doi.org/10.1890/120144>.
 31. Doyal L, Gough I. *A Theory of Human Need*. London, UK: Palgrave; 1991. Available: <https://doi.org/10.1007/978-1-349-21500-3>.
 32. Chaigneau T. *Understanding Community Support towards Three Marine Protected Areas in the Visayas Region of the Philippines* (University of East Anglia); 2013. Available: https://ueaeprints.uea.ac.uk/48083/1/Tomas_Chaigneau-PhD_Thesis_Post_Viva_131205.pdf.
 33. Summers JK, Harwell LC, Smith LM. A model for change: An approach for forecasting well-being from service-based

- decisions. *Ecological Indicators*. 2016;69: 295-309.
34. Summers JK, Harwell LC, Buck KD, Smith LM, Vivian DN, Harvey JE, McLaughlin MD, Hafner SF. Development of a Climate Resilience Screening Index (CRSI) Sustainable and Healthy Communities Research Program Technical Report. EPA600/R-17/238. Washington, DC: Office of Research & Development; 2017.
35. Heezik YV, Brymer Y. Nature as a Commodity: What's Good for Human Health Might Not Be Good for Ecosystem Health. *Front. Psychol*; 10 September 2018. Available: <https://doi.org/10.3389/fpsyg.2018.01673>.
36. Schebella MF, Weber D, Lindsey K, Daniels CB. For the Love of Nature: Exploring the Importance of Species Diversity and Micro-Variables Associated with Favorite Outdoor Places. *Front. Psychol*; 01 December 2017. Available: <https://doi.org/10.3389/fpsyg.2017.02094>.
37. Griggs D, Stafford-Smith M, Gaffney O, Rockström J, Ohman MC, Shyamsundar P, Noble I. Policy: sustainable development goals for people and planet. *Nature*. 2013;495(7441):305–307. Available: <https://doi.org/10.1038/495305a>.
38. Sachs JD. From millennium development goals to sustainable development goals. *Lancet*. 2012;379(9832):2206–2211. Available: [https://doi.org/10.1016/S0140-6736\(12\)60685-0](https://doi.org/10.1016/S0140-6736(12)60685-0).
39. Guerry AD, Polasky S, Lubchenco J, Chaplin-Kramer R, Daily GC, Griffin R, Vira B. Natural capital and ecosystem services informing decisions: From promise to practice. *Proceedings of the National Academy of Sciences*. 2015;112(24): 7348–7355. Available: <https://doi.org/10.1073/pnas.1503751112>.
40. Booyen F. An overview and evaluation of composite indices of development. *Social Indicators Research*. 2002;59:115-151.
41. Saltelli A. Composite indicators between analysis and advocacy. *Social Indicators Research*. 2007;81:65-77.
42. Carpenter SR, Mooney HA, Agard J, Capistrano D, DeFries RD, Diaz S, Dietz T, Duraiappah AK, Oteng-Yeboah A, Pereira HM, Perrings C, Reid WV, Sarukhan J, Scholes RJ, Whyte A. Science for managing ecosystem services: Beyond the Millennium Ecosystem Assessment. *Proceedings of the National Academy of Sciences*. 2009;106:1305-1312.
43. Haines-Young R, Potschin M. Chapter Six: The links between biodiversity, ecosystem services and human well-being. In: Raffaelli D, Frid C. *Ecosystem Ecology: A New Synthesis*. BES Ecological Reviews Series. Cambridge: CUP; 2010.
44. Fisher B, Turner RK, Morling P. Defining and classifying ecosystem services for decision making. *Ecological Economics*. 2009;68:64.
45. Groot RS, Alkemade R, Braat, Hein L, Willeman L. Challenges in integrating the concept of ecosystem services and values in landscape planning, management and decision making. *Ecological Complexity*. 2010;7:260-272.
46. Lindahl JC. *On My Swedish Island: Discovering the Secrets of Scandinavian Well-being*. New York: Jeremy P. Tarcher/Penguin. 2002;301.
47. UN. *Transforming our World: the 2030 Agenda for Sustainable Development*. New York, USA: United Nations; 2015.
48. Capaldi CA, Passmore HA, Nisbet EK, Zelenski JM, Dopko RL. Flourishing in nature: a review of the benefits of connecting with nature and its application as a wellbeing intervention. *Int. J. Wellbeing*. 2015;5:1–16. DOI: 10.5502/ijw.v5i4.449.
49. Suich H, Howe C, Mace G. Ecosystem services and poverty alleviation: A review of the empirical links. *Ecosystem Services*. 2015;12:137–147. Available: <https://doi.org/10.1016/j.ecoser.2015.02.005>.

© 2022 Rani and Sangwan; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:

<https://www.sdiarticle5.com/review-history/85164>