What is the influence on socio-economic well-being of UNESCO biosphere reserves in Southeast Asia? A systematic review protocol

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Abstract

Background

UNESCO biosphere reserves have historically hoped to play a crucial role in contributing to sustainable development by bringing about win-win outcomes for both biodiversity and socio-economic development. However, recent studies show of the need for a more thorough understanding of the interaction between conservation and socio-economics. Moreover, the nexus between conservation intervention and human development has been facing sizeable challenges due to the conflicting interests induced by rapid social and environmental challenges, such as climate change. This, therefore, raises the need for a deeper understanding of the relationship between natural conservation and socio-economic development. In this systematic review, we will enrich the understanding on the relationship between natural conservation and socio-economic development through examining the impacts of UNESCO biosphere reserves on socio-economic well-being in South East Asia countries.

Method

This systematic review stems from a systematic map by Eales et al (2020) to examine the impact of marine management and conservation interventions on human well-being in South East Asia. The systematic map documents multiple types of intervention and outcome and provides an overview on the topic. Building from the systematic map, this systematic review will be more focused on the intervention of UNESCO biosphere reserves and socio-economic outcomes, and will cover both terrestrial and marine UNESCO reserves. We will include any

relevant studies identified by the systematic map. We will also conduct further searches in the English language and any other languages within the capability of the review team to include both academic papers and grey literature. Study screening will be conducted in two steps: title and abstract, and full-text. Selected studies (decisions based on pre-defined inclusion criteria) will be assessed for validity based on critical appraisal checklists. We will extract relevant information such as study site/area/year of designation, population, intervention, study design, type of study, outcome measurements and factors affecting the outcomes. A narrative synthesis will be conducted to investigate which aspects of socio-economic wellbeing have been affected by UNESCO biosphere reserves. We will undertake a quantitative synthesis if the available data is suitable.

Keywords

UNESCO biosphere reserves, conservation, Southeast Asia, human well-being, socio-economics

Background

South East Asia features remarkably high biodiversity (P.Koh et al., 2013) and an enormous amount of carbon stored in peatlands (Miettinen et al., 2011). However, tropical forest in this region has been experiencing a high rate of forest loss, especially during the 1990s (Miettinen et al., 2011) and this rapid deforestation over the last decades has been driven mainly by industrial agriculture (P.Koh et al., 2013). The current rapid rate of deforestation in the region has resulted in serious global consequences (P.Koh et al., 2013). In this context, UNESCO biosphere reserves, which ban or restrict destructive activities in core zones, and also promote solutions reconciling the conservation of diversity, are expected to play a crucial role in contributing to sustainable development regionally and globally.

The concept of Biosphere Reserves was introduced in 1975 (Jaisankar, Velmurugan, & Sivaperuman, 2018) by UNESCO in response to the need for conservation of biodiversity along with its sustainable use. Biosphere reserves comprise terrestrial, marine and coastal ecosystems for the purpose of preserving genetic diversity[1] in representative ecosystems by protecting wild animals, the traditional life style of inhabitants and domesticated plant/animal genetic resources (Jaisankar et al., 2018). Currently, Southeast Asia is home to 35 biosphere reserves[2]. This model of natural conservation has been expected to bring about win-win outcomes for both biodiversity and socio-economic development (Svarstad et al., 2008; Baker et al., 1995). However, some research shows a lack of thorough understanding

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[1] http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/
[2] http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/asia-and-the-pacific/

of conservation and socio-economic interactions (Bennett & Roth, 2015; Chaigneau & Brown, 2016; Woodhouse et al., 2015). For example, according to Woodhouse et al. (2015), conservation interventions can have positive impacts on the local economy through generating jobs and alternative livelihoods, but could negatively impact other social aspects of the communities, i.e. social relationships, autonomy. Some conservation interventions, for example, the UNESCO biosphere reserves in Malaysia such as Tasik Chini have posed socio-economic challenges to some local communities, such as a low-income traps, disparate livelihood alternatives, widespread symptoms of alcoholism/substance abuse and safety and cultural integrity issues of residential areas involving tourism development. (Kurnia, 2011).

In addition, the nexus between conservation intervention and human development has been facing sizeable challenges due to the conflicting interests induced by rapid social and environmental challenges, such as climate change. This, therefore, raises the need for a thorough understanding of the relation between natural conservation and socio-economic development. The topic has gained increasing attention in the past decades, reflected in a number of secondary research articles published recently. McKinnon et al. (2016) published a systematic map with 1043 articles to document the impacts of natural conservation interventions on different domains of human wellbeing in developing countries. Ban et al. (2019) reviewed 118 articles to analyze well-being outcomes related to marine protected areas on a global scale with a focus on both positive and negative impacts on people. In a systematic map, Eales et al. (2020) found 287 articles of evidence on the impact of marine management and conservation interventions on human well-being of coastal communities in South East Asia (SEA). Expanding on these reviews, our systematic review will contribute to enrich the understanding on the relationship between natural conservation and socio-economic development with a focus on UNESCO biosphere reserves. Though a recognised challenge for the management of UNESCO biosphere reserves is to harmonize the interactions between the environment and humans (Reed & Egunyu, 2013; UNESCO, 2010), the extent of trade-offs between the environmental protection that UNESCO biosphere reserves provide and the socio-economic wellbeing of communities dependant on the reserves has not been fully documented. In this review, we will build and expand on the searches by Eales et al. (2020) to search for relevant documents examining the effects of UNESCO biosphere reserves on socio-economic well-being in SEA countries.

Stakeholder engagement

This review is conducted with the engagement of the Vietnam Man and Biosphere Program (MAB Vietnam) National Committee and UNESCO Regional Science Bureau for Asia and the Pacific. The UNESCO representatives have identified the need to understand to what extent interventions undertaken in UNESCO biosphere reserves in SEA impact the socio-

economic development of the region. This is seen to have vital implications for natural conservation implementation in the future. The stakeholders will suggest sources of grey literature and provide annual reports by UNESCO biosphere reserves in SEA and the reports by the Southeast Asian Biosphere Reserves Network (SeaBRnet). This grey literature will be an important component in this review examining the influence of the UNESCO biosphere reserves on socio-economic development in the region. A scoping meeting was arranged between the review team and MAB Vietnam to discuss the potential factors affecting the success or failure of a UNESCO biosphere reserve and this has informed the development of this protocol.

Objective of the review

This review examines the question:
"What are the impacts of activities undertaken in UNESCO biosphere reserves on socio-economic well-being in Southeast Asia?".
This question includes the following key "PICO" components:
- Population: human populations in UNESCO biosphere reserves in Southeast Asia
- Intervention: activities undertaken in UNESCO biosphere reserves*
- Comparator: not necessary (we consider studies with and without comparator). Where present, an eligible comparator is the same site before activities undertaken, or a site without activities (we will note whether the site was designated as a UNESCO biosphere reserve at the time of the comparator), or a site with activities but outside of a UNESCO biosphere reserve.
- Outcomes: any measures of socio-economic status.

* The activities undertaken must align with the stated functions of UNESCO biosphere reserves; having the aim of one or more of the following[3]:

- Conservation of biodiversity and cultural diversity
- Economic development that is socio-culturally and environmentally sustainable
- Logistic support, underpinning development through research, monitoring, education and training.

During review scoping, and based on the stakeholder engagement, we attempted to find research on the topic of interest to stakeholders: how management of UNESCO biosphere reserves has affected socio-economic development in SEA. We were unable to locate

[3] https://en.unesco.org/node/314143

research on this topic. We instead found some primary research on how interventions undertaken within UNESCO biosphere reserves have affected socio-economic development. We posit that there may be articles that describe and report the socio-economic situation in UNESCO biosphere reserves, and that may mention interventions undertaken in the reserves, but they do not constitute primary research because they do not contain a defined research methodology. In response to these scoping findings, we acknowledge these articles exist, but will not include them in our review, because without a research methodology, we will be unable to assess the quality of evidence they provide.

Methods

This study is conducted as part of the GCRF UKRI-funded Blue Communities programme (2018-2021), aiming at building capacity for sustainable interactions with marine ecosystems for the benefit of the health, well-being, food security and livelihoods of coastal communities in Southeast Asia. In line with this, a group of authors undertook a systematic map to examine the impact of marine management and conservation interventions on human well-being in SE Asia (Eales et al, 2020, in review). The systematic map documents multiple types of intervention and outcome and provide an overview on the topic. Based on the systematic map, this systematic review will be more focused on UNESCO biosphere reserve and social and economic outcomes. The ecosystem scope of this review will be wider than the map: the review will include both terrestrial and marine areas, whilst the map was focused solely on marine and coastal areas. The steps presented following are similar to those described in Eales et al. (2020, in prep).

Searches
Search strategy

We will take both published and unpublished literature in English into account in this review. We will conduct searches in the following sources: bibliographic databases, web-based search engines and grey literature. We will also use the database from the systematic map in Eales et al (2020) to identify relevant literature from the extensive and comprehensive searching undertaken for that work.

Search string
In this review, we will not include Outcome terms into the search string, because when we tested the search with only Population/ Intervention terms, the number of articles was low enough to be manageable for screening. The rationale for focusing on names of UNESCO biosphere reserves, and the term "biosphere reserve" is that any intervention undertaken, should have been done with the understanding that the site was a UNESCO biosphere reserve,

and that the intervention was aiming to meet the UNESCO goals. If an article reported research undertaken in a UNESCO biosphere reserve, but did not mention the search terms below, the intervention was highly unlikely to be under the management of UNESCO or aiming to meet the goals, and we are not including such research in our review. If outcome terms were added into the search, there is a danger of potentially missing articles, if authors used outcome terms which were not included in our search terms. The search string below is formatted for Web of Science, as an example.

For bibliographic databases:

Population:

We notice that there are different ways in spelling some names of UNESCO biosphere reserves. Specifically, "Tonle Sap" may also appear as "Tonlé Sap"; "Inlay Lake" may appear as "Inle Lake" and "Hauy Tak Teak" as "Haui Tak Teak" or "Huai Tak Teak". Therefore, we include the different names of the above biosphere reserves in the search string:

("Tonle Sap" OR "Tonlé Sap" OR "Cibodas" OR "Komodo" OR "Lore Lindu" OR "Tanjung Puting" OR "Gunung Leuser" OR "Siberut" OR "Giam Siak Kecil-Bukit Batu" OR "Wakatobi" OR "Bromo Tengger Semeru*" OR "Taka Bonerate-Kepulauan Selayar" OR "Belambangan" OR "Berbak-Sembilang" OR "Betung Kerihun Danau Sentarum Kapuas Hulu" OR "Rinjani Lombok" OR "Tasik Chini" OR "Crocker Range" OR "Inlay Lake" OR "Inle Lake" OR "Indawgyi" OR "Puerto Galera" OR "Palawan" OR "Albay" OR "Sakaerat" OR "Hauy Tak Teak" OR "Haui Tak Teak" OR "Huai Tak Teak" OR "Mae Sa-Kog Ma" OR "Ranong" OR "Can Gio Mangrove" OR "Dong Nai" OR "Cat Ba" OR "Red River Delta" OR "Kien Giang" OR "Western Nghe An" OR "Mui Ca Mau" OR "Cu Lao Cham*" OR "Langbiang" OR "Boeng Chhmar" OR "Prek Toal" OR "Puerto Princesa Subterranean River" OR "Tubbataha Reefs" OR "Kaper Estuary" OR "Laemson Marine National Park" OR "Kraburi Estuary")

OR

Intervention: ("biosphere reserve*")

Based on the capabilities of each database, we will change the search string with different wording to adapt to the database. For example, in Web of Science, we use "Berbak$Sembilang", which will retrieve "Berbak Sembilang" and "Berbak-Sembilang". Similarly,

> "Giam Siak Kecil$Bukit Batu", which will retrieve "Giam Siak Kecil and Bukit Batu", "Giam Siak Kecil-Bukit Batu", and "Giam Siak Kecil Bukit Batu";
>
> "Taka Bonerate$Kepulauan Selayar", which will retrieve "Taka Bonerate Kepulauan Selayar" and "Taka Bonerate-Kepulauan Selayar";

"Berbak$Sembilang", which will retrieve "Berbak Sembilang" and "Berbak-Sembilang";

"Betung Kerihun$Danau Sentarum Kapuas Hulu", which will retrieve "Betung Kerihun Danau Sentarum Kapuas Hulu" and "Betung Kerihun-Danau Sentarum Kapuas Hulu"

"Rinjani$Lombok", which will retrieve "Rinjani Lombok", "Rinjani-Lombok" and "Rinjani in Lombok"

We note specificities of database search engines and account for this in our search strategies, for example, in SCOPUS, punctuation is ignored: "Berbak Sembilang" will retrieve "Berbak Sembilang" and "Berbak-Sembilang".

Bibliographic databases

This review is built and expands on the systematic map by Eales et al., (2020). We use four of the five bibliographic databases: Medline, Web of Science Core Collection, SCOPUS and Environment Complete. We do not include Global Health (Ovid) because it focuses on health topics. However, the search strategy is amended according to our objective, as above. We will not impose any date cut-offs, and searches will not be limited by language. We will use the University of Exeter Institutional subscriptions to databases. Searches will be undertaken for "topic words" rather than "full text", to limit the number of irrelevant retrieved hits.

Web – based search engines

We will perform an internet search by using following search engines:

Google (www.google.com)

Google Scholar (www.scholar.google.com)

The complementary search will be conducted using the following search terms:

Population: name of one of 35 UNESCO biosphere reserves in SEA

OR

Intervention: ("biosphere reserve*")

The first 100 relevant search results in each engine will be considered for appropriate literature. We will not restrict the language of the search results. We will only look at the first 100, because from scoping exercises, we do not anticipate that many studies in this topic be present in grey literature outside of the specialist websites and repositories that we will search separately (below).

Specialist websites and theses databases

According to the consultant from MAB Vietnam National Committee, the following specialist websites of organizations are included to search for publications including grey literature:

- https://unesdoc.unesco.org/ark:
- https://jfit-for-science.asia/
- http://mabvietnam.net/

We will search 11 scholarly sites for relevant evidence, particularly theses and reports. The search string from the database searches will be adapted to reflect the search functionality of on each website.

List of academic thesis databases searched for relevant studies:

- Cybertesis
- DART-Europe
- DiVA
- Ethos
- NARCIS
- National ETD
- National Library of Australia Trove Service
- NDLTD
- Proquest Dissertations and Theses Global
- Repositorio Cientifico de Acesso Aberto de Portugal
- Theses Canada

For all website and catalogue searches we will record the URL, the strategy or search terms used, the date the search was undertaken, the results, and the name of the reviewer undertaking the search. The information will be collated in an Appendix for the systematic review report.

Other data sources/ methods of obtaining evidence

The stakeholders from MAB Vietnam National Committee and UNESCO will provide and suggest unpublished data. We will also include any relevant literatures cited by the included studies. Periodic reports from UNESCO biosphere reserves can provide useful sources of information, for example, the 2019 report from Cu Lao Cham lists research projects that has been undertaken in the reserve. Such reports may enable us to identify gaps between funded research and the publication of this research.

We will undertake citation checking of primary studies identified as relevant to our systematic review. This will aim to find further relevant studies, and additional information relevant to the same study provided in linked papers e.g. information about other outcomes for the same study. We will also search bibliographies of systematic maps or reviews and other evidence reviews that are focused on the topic area, time and resource permitting.

Estimating the comprehensiveness of the search

In order to check the comprehensiveness of the bibliographic database search, we have tested the search using some articles that has been pre-identified as relevant to our topic to make sure that they are retrieved by the search. These articles are listed below

- D'Agnes, L., D'Agnes, H., Schwartz, J. B., Amarillo, M. L., & Castro, J. (2010). Integrated management of coastal resources and human health yields added value: a comparative study in Palawan (Philippines). Environmental Conservation, 398-409.
- Kuenzer, C., & Tuan, V. Q. (2013). Assessing the ecosystem services value of Can Gio Mangrove Biosphere Reserve: Combining earth-observation-and household-survey-based analyses. Applied Geography, 45, 167-184.
- Garces, L. R., Pido, M. D., Tupper, M. H., & Silvestre, G. T. (2013). Evaluating the management effectiveness of three marine protected areas in the Calamianes Islands, Palawan Province, Philippines: process, selected results and their implications for planning and management. Ocean & coastal management, 81, 49-57.
- Ngoc, Q. T. K. (2018). Impacts on the ecosystem and human well-being of the marine protected area in Cu Lao Cham, Vietnam. Marine Policy, 90, 174-183.
- Dygico, M., Songco, A., White, A. T., & Green, S. J. (2013). Achieving MPA effectiveness through application of responsive governance incentives in the Tubbataha reefs. Marine Policy, 41, 87-94.

Four of the five articles were retrieved by the initial search strategy in Web of Science Core Collections. The article by Dygico et al 2013 was not retrieved by our initial search strategy. We found that this was because the article referred to a named site (Tubbataha reefs) within the UNESCO biosphere reserve (Palawan), rather than the reserve itself. With this knowledge we retrieved a list of multi-internationally designated sites within UNESCO biosphere reserves from our stakeholder and modified our search strategy to include these. The sites were:

- Boeng Chhmar and Associated River System and Floodplain RAMSAR site (within Tonle Sap, Cambodia)- we added "Boeng Chhmar" as a search term
- Prek Toal Ramsar Site RAMSAR site (within Tonle Sap, Cambodia) add "Prek Toal" as a search term
- Komodo National Park UNESCO World Heritage Site (within Komodo, Indonesia) – no additional search terms required
- Tropical Rainforest Heritage of Sumatra UNESCO World Heritage Site (within which Gunung Leuser is situated in Indonesia)- no additional search terms required
- Puerto Princesa Subterranean River National Park UNESCO World Heritage Site (within Palawan, Philippines)- we added "Puerto Princesa Subterranean River" as a search term
- Tubbataha Reefs National Park UNESCO World Heritage Site (within Palawan, Philippines)- we added "Tubbataha Reefs" as a search term
- Kaper Estuary - Laemson Marine National Park - Kraburi Estuary RAMSAR site (within Ranong, Thailand)- we added "Kaper Estuary" "Laemson Marine National Park" and "Kraburi Estuary" as search terms

Search update

We will update the searches, closer to the time of publishing our full systematic review report if our resources allow.

Article screening and study inclusion criteria

Screening process

The screening process will be conducted in two steps by one of two independent reviewers: (1) screening title and abstract and (2) screening full text of articles. In order to ensure the inter-reviewer consistency, consistency checking will be applied at both stages using a random sample of 10% of articles.

First, the title and abstract of each article will be screened based on the study inclusion criteria (Table 1). The articles meeting inclusion criteria will be obtained at full text and further screened against the criteria to establish the final data for reviewing. The articles that do not meet the criteria at full text will be excluded and we will provide a list of these with the reasons for exclusion of each article

Any questionable articles and conflicting opinion during screening process will be discussed by the two reviewers. If it is necessary, a third reviewer will be invited to resolve. Further details will be added to the inclusion criteria to clarify where there may have been previous ambiguity. Where authors of the systematic review have authored articles included within the review, they will not be involved in decisions regarding their own work.

Inclusion criteria

The inclusion criteria for the systematic review are described in table 1.

Table 1. Inclusion criteria

Inclusion criteria		Exclusion criteria
Types of study	Empirical studies	Theoretical articles, commentary and review papers
Types of population	Study focuses on human populations in 35 UNESCO biosphere reserves in SEA countries including: Tonle Sap, Cibodas, Komodo, Lore Lindu, Tanjung Putting, Gunung Leuser, Siberut, Giam Siak Kecil - Bukit Batu, Wakatobi, Bromo Tengger Semeru-Arjuno, Taka Bonerate-Kepulauan Selayar, Belambangan, Berbak – Sembilang, Betung Kerihun Danau	Study focuses on human populations outside the UNESCO biosphere reserves or outside SEA

	Sentarum Kapuas Hulu, Rinjani Lombok, Tasik Chini, Crocker Range, Inlay Lake, Indawgyi, Puerto Galera, Palawan, Albay, Sakaerat, Hauy Tak Teak, Mae Sa-Kog Ma, Ranong, Can Gio Mangrove, Dong Nai, Cat Ba, Red River Delta, Kien Giang, Western Nghe An, Mui Ca Mau, Cu Lao Cham - Hoi An, Langbiang	
Types of intervention	Study involves activities/programs/policies* * The activities/programs/policies undertaken must align with the stated functions of UNESCO biosphere reserves; having the aim of one or more of the following: • Conservation of biodiversity and cultural diversity • Economic development that is socio-culturally and environmentally sustainable • Logistic support, underpinning development through research, monitoring, education and training	Study does not involve activities/programs/policies aligned with the stated functions of UNESCO biosphere reserves (see opposite)
Types of comparator	Where present, an eligible comparator is the same site before activities undertaken, or a site without activities (we will note whether the site was designated as a UNESCO biosphere reserve at the time of the comparator), or a site with activities but outside of a UNESCO biosphere reserve.	We will include studies with no comparator
Types of study	Studies containing quantitative data (quantitative studies or mixed studies where quantitative data are reported separately)	Qualitative Mixed studies (qualitative and quantitative data are combined and results are not separated for reporting)
Types of outcome	Study focuses on one or more following outcome categories, which are established in the systematic map by Eales et al. (2020):	Study does not measure any socio-economic outcomes.

	Economic living standard: income, employment, employment opportunities, wealth/poverty, savings, payments, loans

Material living standard: access to and availability of food, fibre, fuel and basic infrastructure (electricity, water, telecommunications and transportation), provision of shelter, assets owned (e.g. television)

Health: Physical health, mental health, balanced nutrition, longevity/life expectancy, maternal health, infant and child health, birth control provisioning, access to health care (antibiotics, transplants), occurrence of diseases, public health infrastructure (e.g. disease prevention, mental health support)

Education: Education infrastructure (access to school, access to training, quality of education, classroom sizes, curriculum relevance and up-to-date); informal education (transfer of knowledge and skills includes livelihood skills, traditional knowledge and skills); formal education (degrees awarded, students enrolled)

Social relations: Interactions between individuals, within and/or between groups (communities, stakeholders, ethnic groups, gender); degree/frequency of conflict, strength of relationships and connectedness, ability to work together, ability to communicate, engage in debate, trust and help others | |

| | Security and safety: Physical security (personal safety and security), security of access to resources; human rights; vulnerability, personal and community resilience and adaptive capacity

Governance: Structures and processes for decision making including both formal and informal rules; includes participation and control in decision making, accountability, justice, transparency of governance.

Subjective well-being: Measures of happiness, Measure of quality of life, Measure of personal satisfaction supported by some value of ecosystem(s) and/or resources

Culture and spirituality: Cultural, societal and traditional values of natural resources and nature to the community; sense of home or belonging; cultural identity and heritage; spiritual or religious beliefs and/or values

Freedom of choice and action: Ability to pursue what you value doing and being; Freedom from norms e.g. gender expectations; Freedom of expression of opinion/beliefs | |
| Language | We will include studies published in English and any other languages within the capability of the review team. | Studies published in languages outside the capacity of the review team. |

If our resources allow, we will also include as an eligible outcome, any natural environment outcomes, for example, biodiversity measures, or habitat status.

Critical appraisal

We have adapted the checklists for quasi-experimental[4] studies by the Joanna Briggs Institute to assess the potential bias of selected studies for full text review (see appendix 1 for more detail). The adaptations have been made to better fit the study designs we are likely to retrieve for this systematic review, using scoping to guide the adaptations. The overall validity of the study will be classified into: High, Low and Unclear. Low validity and unclear studies will be included in our review and we will use subgroup analysis to determine the impact of low or unclear study validity.

The studies will be assessed by at least one of two reviewers. Consistency checking based on a subset of 10% of studies will be applied, and any disagreements will be discussed and clarifications made to the critical appraisal checklist before continuing with the remaining study assessments.

We will use the study validity classifications in our synthesis, reporting the validity of studies alongside a narrative synthesis and where appropriate, undertaking sensitivity analyses in narrative and/or quantitative synthesis. Where authors of the systematic review have authored articles included within the review, they will not be involved in critical appraisal if their own work. We will also assess the validity of the evidence base as a whole, taking into account not only individual study validity, but also factors such as consistency of the evidence, and publication bias. We will be guided by tools such as GRADE, originally developed for studies in healthcare (Guyatt et al., 2008).

Data extraction

An Excel spreadsheet for data extraction (meta-data and quantitative data) will be completed for each study and will report information including:

- Study site/area/year of designation
- Population e.g. sex, age, occupation
- Intervention (type, description)
- Study design
- Duration of intervention
- Measurement methodologies
- Duration of outcome measurements
- Outcome metrics

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[4] https://joannabriggs.org/sites/default/files/2019-05/JBI_Quasi-Experimental_Appraisal_Tool2017_0.pdf

- Other factors affecting the outcomes
- Citation and details to contact authors
- Linked studies

The above list is not restrictive and will be added to, should further categories of data be useful to record. Data extraction will be conducted by at least one of two reviewers. A sample extraction of 10% of the studies will be cross checked by two independent reviewers to address potential disagreement and seek for the agreement. Data extraction forms will be adapted and completion notes expanded on to provide further clarity. If time and resources allow, we will contact authors of studies to request missing or additional information for data extraction.

Potential effect modifiers/reasons for heterogeneity

After consultation with researchers and based on previous research articles in this topic area, we have compiled a (non-exhaustive) list of factors that may influence the strength of effect:

- Geographical location
- The area of UNESCO biosphere reserve
- The year of designation (before or after Seville Strategy in 1995)
- Governance (leadership, building partnerships, government and stakeholder commitment, support and on-going support)
- Participation and collaboration of local community, public, private stakeholders and NGOs
- Characteristics of landscape and zonation
- Funding for the reserves
- Human resources of the reserves (staff experience, knowledge and availability)
- Management plans and vision
- Monitoring and evaluation frequency and indicators
- Research integration (connection to research institutes)
- Land use in the surrounding area before, during the designation

As the review progresses, more effect modifiers may be identified.

Data synthesis and presentation

We will provide a narrative synthesis to determine which aspects of socio-economic wellbeing may be impacted by UNESCO biosphere reserves. We will tabulate information and use visualizations to describe information such as themes/trends, study groups (interventions, study design, study sites) and outcomes.

We will narratively investigate the impact of the effect modifiers identified. We will identify knowledge clusters and knowledge gaps by comparing meta-data that has been tabulated or presented in a matrix. We will compare and contrast the practices with both positive and negative impacts of UNESCO biosphere reserves. If possible, we will undertake a quantitative synthesis. The quantitative synthesis will calculate effect sizes using standardized techniques (Borenstein, Hedges, Higgins, & Rothstein, 2011), and explore heterogeneity using sensitivity analysis and/or subgroup analysis where the number of studies allow. Where we have sufficient studies, we will investigate the influence of publication bias using a funnel plot. We do not provide full details on the methodologies to handle more complex data sets or combining data sets because this will depend on each study we encounter. Full methods will be provided in the final report, along with justification for the methods we will use.

Declarations

The authors declare no conflict of interest.

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