Compliance to reviewers’ comment

**Reviewer #1:**

The article entitled "Mapping ecosystem services flow from the three protected areas in the Fareastern Himalayan landscape: An impetus to regional cooperation" is a well written manuscript. The paper is focusing on interregional ecosystem services flow between the three countries- China, India and Myanmar sharing the Far-eastern Himalayan landscape, and tried to answer what services are important for stakeholders, where the services arises, where they are being used, and what factors deteriorate the services. The approach used for mapping the ecosystem flow is robust and important for other related study focus on the concept of ecosystem services in planning and management.

My comment is: While mapping of Service Provision Hotspots (SPHs), the Service Beneficiary Areas (SBAs) and degraded Service Provision Hotspots (dSPHs), the gap between the supply and demand did not clearly show and I suggest further improvement especially if the authors have quantitative data. This attempt could help for prioritization of the landscape management sites in which the study lacks. The SBAs, DSPHs and SPHs maps were done through Euclidian distance analysis and except Fig 4, the remaining maps lack legend.

**Thank you for your encouraging remarks on the paper, and for your suggestions to improve the manuscript. We have tried out best to address all your concerns and comments and hope the changes are acceptable to you. Please see our explanations and changes made in the document as per your specific comments.**

While mapping of Service Provision Hotspots (SPHs), the Service Beneficiary Areas (SBAs) and degraded Service Provision Hotspots (dSPHs), the gap between the supply and demand did not clearly show and I suggest further improvement especially if the authors have quantitative data. This attempt could help for prioritization of the landscape management sites in which the study lacks.

**Thank you for prompting us to think more in terms of what SPHs, SBAs and dSPHs actually mean in terms of supply and demand. The gaps between supply and demand have now been quantified in terms of % representation of SPHs, SBAs and dSPHs for each of the services (please see explanation of SPHs, SBAs, and dSPHs four services from line 342 to line 474). We now also discuss usefulness of these functionally important areas for spatial planning for PAs (see explanation of section 5.1 from line 737 to 794. Using the PCA bioplot we have also explained the relationships between these provision-beneficiary points for the fours ecosystem services and explained what it means in terms of prioritization for ES management in the landscape (please see figure 9) - where prospective areas are now mapped based on SPHs, SBAs and dSPHs points beyond PAs.**

The SBAs, DSPHs and SPHs maps were done through Euclidian distance analysis and except Fig 4, the remaining maps lack legend.

**We have rechecked the figures and provided the legend in all figures.**

**Reviewer #2:**

This is a well-written paper on a relevant subject for this journal. It presents some interesting results on ecosystem services supplied from three protected areas in China, India and Myanmar from three workshops involving participatory mapping with representatives from government departments (protected area managers, ministries and line departments), research and academic institutions, development practitioners from international organizations and non-governmental organizations, community members, and private sector institutions.

While the results are of some interest to protected area managers and policy makers, and appear to have been valuable for awareness raising, in my view the manuscript in its current form is not suitable for publication in an international journal. The ES assessment methods and mapping are relatively simple. The ranking is a simple importance ranking with no attempt to quantify the actual services identified. The study has no analysis of the trade-offs or issues in managing for multiple ecosystem services and no analysis of the differences between the services provided by the protected areas in different countries. Therefore, no new insights or conceptual advances are presented for the academic field on quantifying or managing ecosystem services supplied by protected areas.

The description of the methods suggests that the type of data collected in the workshops does not allow a deeper analysis of the following factors that would provide a more significant contribution:

1. ecological or socio-economic approaches to quantifying or valuing ES, ways of improving understanding of the ES concept by PA managers (Hummel et al. 2019),

2. design of processes for engaging in workshops and surveys and other types of participatory processes and tools to better understand and communicate the benefits of ES provided by protected areas (Schirpke et al. 2017); and

3. Understanding capacity to deliver, pressures and demands, and flows of ecosystem services from different parts of the landscape under different conditions (Villamagna et al. 2013).

**Thank you very much for your critical but insightful comments that really helped us to improve strengthen our manuscript. We have tried out best to address all your concerns and comments and hope the changes are acceptable to you. Please see our explanations and changes made in the document as per your specific comments**

While the results are of some interest to protected area managers and policy makers, and appear to have been valuable for awareness raising, in my view the manuscript in its current form is not suitable for publication in an international journal.

**As rightly mentioned by you, given the workshop design, although there was limitation for deeper quantitative analysis of ecological processes and functions, some quantitative analysis was still possible – which we have now included in the manuscript. We have also indicated the limitation in methods. (line: 68)**

The ES assessment methods and mapping are relatively simple. The ranking is a simple importance ranking with no attempt to quantify the actual services identified.

**Actually, there were other exercises we did during the workshop which we did not include in our earlier manuscript. Your comments really helped us see the relevance of those other exercise in terms of quantitative analysis. And inclusion of those have really enhanced our analysis with regard to our purpose of providing new insight to this discourse of mainstreaming ES for effective PA management in a transboundary landscape.**

**In terms of deeper quantification of ecosystem services, we had two limitations. First, this was a workshop driven knowledge production process that limited our interactions to the participants in the workshop, and second, our participants were mix of government officials, academia, private sector institutions, development institutions and community members from villages in and around the PAs. This meant, we had to keep the methods and explanation as simple as possible - to which most participants could relate to and contribute.**

**In order to make the workshop more engaging and facilitative, we moved from simple listing to ranking to map based visual mapping, and then conceptual scenario analysis. In addition to this, since we wanted to compare situations of PAs in three countries we also needed to harmonize the process for the three workshop.**

**We would like to mention that we have now thoroughly revised the method and manuscript now brings analysis of broader tradeoffs between the multiple services, and relationship between source of services and beneficiaries, and status of services in terms of vulnerability and use.**

**Please see revised methods (lines: 152-280). Where we bring in participatory identification of services as per stakeholders diverse perception and values - includes vulnerability and usefulness analysis; Participatory mapping of flow to understand extent of supply and demand, and participatory scenario analysis to understand tradeoff.**

**We do accept that our methodologies are still limited in terms of formal quantification of ES that deals with ecological functions and processes. This was because our focus was more towards promoting social learning and knowledge co-production and bring stakeholders with disparate background and mandate to be on the same level of understanding about what is the broad situation and how could ES delivery from PA change under different management regime. However, we believe the results have allowed us to evaluate importance of PAs in a multidisciplinary way.**

The study has no analysis of the trade-offs or issues in managing for multiple ecosystem services

**We include participatory scenario analysis and appraisal of current situation of PAs against those scenario that has allowed us to discuss broader scale tradeoff between the services, and see the challenges in managing multiple ecosystems. We discuss how different countries are placed in terms of current situation of four prioritized ES, and how in different plausible management scenarios, the ES could change and what are the tradeoffs between them. (Please see figure 7: Line 507; and explanation – lines 477- 531)**

and no analysis of the differences between the services provided by the protected areas in different countries. Therefore, no new insights or conceptual advances are presented for the academic field on quantifying or managing ecosystem services supplied by protected areas.

**We now embed the comparison between the three PAs in different countries in terms of:**

* **vulnerability and usefulness (lines: 312-328);**
* **extent of SPHs, SBAs, and dSPHs for individual services (lines: 343- 475);**
* **logic for each scenario (Table 2. Lines 486);**
* **performance of four services in each scenario by PAs (Figure 7: Line 507); and**
* **individual PCA bioplot analysis for each PAs (Figure 8- Line 769; and Text description lines 744-770).**

The description of the methods suggests that the type of data collected in the workshops does not allow a deeper analysis of the following factors that would provide a more significant contribution:

**We have incorporated other exercises, and this has helped put the stakeholders’ knowledge in perspective to advance the academic knowledge on mainstreaming ES perspective for PA management. Importantly, the study is now able bring tangible insight on how ES can serve as an impetus for regional cooperation in a transboundary landscape. We highlight some insight on PA spatial planning and collective cooperation pathways to sustain ecosystem services discussing the result in terms of extrapolate:**

**i) Usefulness of PAs in terms of wider objective they serve;**

**ii) extent of overlaps among SPHs, SBAs and dSPHs to mainstream ecosystem services perspective for effective regional scale PA management and planning, and**

**iii) types of cooperation pathways for long term to sustenance of ecosystem services in the landscape. (please see discussion chapters on Lines 732 and 789.)**

Ecological or socio-economic approaches to quantifying or valuing ES, ways of improving understanding of the ES concept by PA managers (Hummel et al. 2019)

**Following the insight from the said publication, we now revolve our discussion around a balanced and inclusive combination of the societal-focused ES approach and the traditional view of conservation, protecting nature, and biodiversity in order to better PA governance, rather holistic maintenance of landscape services through understanding interregional flow of services.**

**Citation has been referred in lines: 31 and 793.**

Design of processes for engaging in workshops and surveys and other types of participatory processes and tools to better understand and communicate the benefits of ES provided by protected areas (Schirpke et al. 2017)

**As also explained above, we now outline the importance of participatory exercise on identification of services, assessment of vulnerability and usefulness of ES, mapping of flow of ES and scenario analysis to understand tradeoff, and how it helped promote social learning among the stakeholder. Also used in reference to how countries can look into PES mechanisms**

**Citation has been referred in lines 46, 743, 856.**

Understanding capacity to deliver, pressures and demands, and flows of ecosystem services from different parts of the landscape under different conditions (Villamagna et al. 2013).

**We now discuss the extent of SPHs, SBAs and dSPHs in relation to enhancing better connectivity between PAs and SPHs outside, better management of areas where SPHs and SBAs overlaps, and shared SPHs and SBAs between the countries.**

**Citation has been referred in lines 51, 871.**