An assessment on the Tiger (*Panthera tigris tigris*) Conservation Action plan (2008-2013), Nepal.

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DOI: 10.29322/IJSRP.15.05.2025.p16135
https://dx.doi.org/10.29322/IJSRP.15.05.2025.p16135

Paper Received Date: 20th April 2025
Paper Acceptance Date: 18th May 2025
Paper Publication Date: 26th May 2025

Abstract

Periodic assessment of conservation action plan from the technical team is necessary. Conservation action plan have five goals and each goal have issues, strategies, and activities. Each point weight one and the score assigned to each point score is 0,0.5 and 1. Score 0 is given to the vague information, which was not quantifiable, 1 is assign to points provided with evidence and 0.5 to the narrow down information (restricting the fields) that if provided with evidence contribute to tiger conservation plan. The overall score on each goal was around 30% except the goal 2 which was 40%. Based on the action plan proposed I assessed the verifiable indicators with the research articles from 2008 to 2020. Articles published >2007 to 2020 was searched in Scopus. In the Scopus search box Tiger or "*Panthera tigris tigris*" and Nepal was searched in article title/Abstract/Keywords. I have separated the research search in two-time frames from 2008 to 2013 and 2014 to 2020 to compare the inclusion of research and number of published articles that support the in the goals of tiger conservation action plan. I found no research articles published in anti-poaching and anti-trafficking operations and transboundary cooperation during the 2008 to 2013. This paucity of research to support the goals of this action plan might be reason for low score in each component. Meanwhile, increase in published articles between 2014-2020 on those goals could enhance the score of action plan and help to achieve quantitative results.

Keywords: Tiger, Nepal, conservation, action plan

Introduction

Tiger (*Panthera tigris tigris*) is an iconic species with high level of enthusiasm for its conservation in its extant range. Among remaining six species of tiger, *Panthera tigris tigris* is one of the species that is found along the lowlands of Nepal and has high value of conservation. With increase in threats, challenges to achieve conservation goals has been complicated and hindered the conservation of threatened species (Margoluis et al. 2013). Conservation mangers and organizations are under the pressure. Some transboundary cooperation and sharing of knowledge are taking places to conserve the threatened species. For instance, Government of Nepal (GoN) has signed the Global Tiger Forum (GTF) commitment to double its tiger population by 2022. With this initiation, to achieve the target implementation has been made through the adoption of tiger conservation plan. Where the conservation plan has their own pros and cons while practicing them in the field to achieve that goals. However, plans are valued as encapsulate visons for the guidance and provide signals towards our commitment (Lyles & Stevens 2014). Thus, an evaluation of quality and content of plans are on increasing trends (Foster et al. 2016) along with investments of time and resources in conservation planning (Bottrill, & Pressey 2012) and it is always necessary to evaluate the plan so that we learn by doing mistakes. Evaluation of conservation plan aids in providing decisions, as revised conservation plan needs to be effective, and achievable (Bottrill & Pressey 2012).

This paper evaluates the Tiger Conservation Action Plan (TCAP) 2008-2013 based on how concrete the goals are mentioned and with supporting facts that if implemented have measurable achievements. Goals with quantitative facts and scientific numbers helps to measure the success of the action plan. Often the goals of conservation plan have constraints because of there are not explicitly explained objectives (Kapos et al. 2008). So, supporting with facts and identifying what should be gauge is important for successful implementation of conservation plan by conservation practitioners, policy makers and donors (Kapos et al. 2008). Sometimes the conservation plan cannot be evaluated because of environmental factors and often intricate with social, political, cultural values and norms (Margoluis et al. 2009). This may be related with indicators they should use to measure the success. Lack of the research has hindered the anchoring of conservation related facts in action plan which could degrade the achievement of actions plan. Some sorts of mismatch between science and practices arises of which we often called it as "implementation gap" (Hulme 2014). On contrary, Inclusion of research promote better conservation outcomes (Newell et al. 2014) and are the crucial for the implementation of species conservation plan (Griffiths & Dos 2012).

Methods

First, I used the https://scholar.google.com/ to review the documents, but I did not find it effective to narrow down the articles and be biased regarding my objectives. There was difficulty in handling the information, as I must search the same title and words next day before I start my research. With my key words like Tiger, Panthera tigris tigris and Nepal numerous research articles including other publication types like letter, review, notes every list were found in each page including not only the information form Nepal but also from other countries. Rather than considering the articles citing or selecting the peer-reviewed articles I choose the Scopus for the easy to narrow down my theme. As I am an initial user of the Scopus, I quickly go through the information page and gain the information regarding the systematic search strategy in Scopus. I want tiger or "*Panthera tigris tigris*" and Nepal to be the main subject of the document. So, I search the word Tiger with connector OR "*Panthera tigris tigris"* AND Nepal in three different search boxes. Those terms are searched in Article title/Abstract/Keywords only. The results were limited based on date Published between 2008 to present with default 7 days with specific type of document, article was selected.

Altogether, 93 research articles were found based on above keywords provided in Scopus search box. After the verification of each articles, I omitted few articles. All together sixty-one research articles abstract was carefully examined to support the verifiable indicators and goals of this recently reviewed tiger conservation action plan. Research articles publication dates were breakdown into two section 2008-2013 and 2014-2020. This breakdown of publication date was done as I thought that low scores in tiger conservation action plan 2008-2013 might be linked with less articles published. As following the assessment criteria, research articles supporting figures are most vital to score point of one. Although I do not assess the tiger conservation action plan 2016-2020, based on assessed action plan goals more research are published to support the tiger conservation for future.

Assessment Criteria of tiger conservation action plan

Since the Tiger Conservation and Action plan of 2008 and 2013 is the revised one, I expected for the incorporation of all the research performed and removal of drawbacks from previous one. The members committee has thought of some necessary points to work on it as compared to the previous one. So, I solely relied on the goal of tiger conservation action plan (2008-2013) to work on the criteria to assess the success of tiger conservation in Nepal. Based on five goals set in action plan, all the issues, strategies and activities were reviewed carefully. I assigned the number ranges from 0 to 1 based on the how likely the issues, strategies and activities are quantified. Score 0 is given to the vague information, which is not quantifiable, 1 is assign to points provided without evidence and 0.5 to the narrow down information (restricting the fields) that if provided with evidence contribute to tiger conservation plan.

Results

Tiger and Prey Base

On the first goal of this action plan issues regarding tiger population vague terms with unquantifiable parameters are used, like is not fully understood, Inadequate. Since this is the conservation plan which is revised what is achieved and what need to be done are not described properly this has lower the point (Figure 1). Issues regarding the prey base were somewhat tried to describe. Strategies are described but could not be quantifiable. Overall, activities are well described which can be quantified with certain time intervals. Some of the points in activities are well defined narrowing down the sectors and could be work with supporting evidence.

Figure 1: Score and point for Issues, Strategies and Activities of goal 1

Habitat Management

Habitat Management is the second goal of the tiger conservation in the action plan 2008-2013. Regarding the habitat plan has proposed the issues like shrinkage, fragmentation, Disturbances and Degradation. Plan has proposed the term management which address four points, and each was given the score of 0.5. The term Habitat and Management were used differently which makes difficulty to understand during the assessment criteria. For the issues in habitat degradation is related to wetland management, grassland management and human related waste. Out of 100 percent issues of habitat only scores 30%, for management also it was around 30% (Figure 2). Strategies incorporated in action plan was 45% and the activities forwarded was around 40% (Figure 2). Activities includes develop landscape approach, develop alternatives resources, and strengthen coordinate efforts. Overall, issues regarding the habitat management are not incorporated in fact basis, whereas strategies and activities are not so effectively supported with quantifiable achievement for future. The overall score is 22/36 (Figure 2).

Figure 2: Score and point for Issues, Strategies and Activities of goal 2

Conflicts Resolution

Issues related to resource demand, co-existence, compensation, incident, and awareness are defined in general term and some of the points are vague to understand and repetitive. The overall, score obtained in this issue aspect in compensation is around 45%(Figure 3). Issues related to compensation are defined well in terms of information and quantitative data representation. Resource demand, Co-existence, and Incidents scores the similar percentage of around 30% (Figure 3). Whereas the awareness score 40%. Strategies included in conflicts resolution based on the assessment criteria score around 17% and activities proposed score 30%. The overall score 26.5/59 (Figure 3).

Figure 3: Score and point for Issues, Strategies and Activities of goal 3

Anti-poaching and anti-trafficking Operations

Anti-poaching and anti-trafficking operations is the fourth objectives of tiger conservation action plan. Issues like illegal trade, law enforcement, incentives, coordination, capacity, and awareness. Among the issues proposed capacity score the highest percentage of around 35% followed by awareness around 32 percent (Figure 4). Incentives in the issues score around 13%. In the issue's aspects illegal trade and law enforcement scores around 29% (Figure 4). Strategies and activities in the anti-poaching and antitrafficking operations score almost similar around 31%. Overall score is about 32.5/75 (Figure 4).

Figure 4: Score and point for Issues, Strategies and Activities of goal 4

Transboundary Cooperation

Species conservation needs the transboundary cooperation. Issues in transboundary cooperation include administration and ecology and international boundary that score around 20% (Figure 5). Strategies and activities score around 30% (Figure 5). Overall score is 10/26 (Figure 5).

Figure 5: Score and point for Issues, Strategies and Activities of goal 5

Overall

Based on the above criteria issues, strategies, and activities among five goal of the conservation plan score highest in Goal two was about 40%, followed by other goals that scores around 30% (Figure 6).

Figure 6: Score and point for all five goals of action plan 2008-2013

Research articles (2008-2013)

Among the 93 research articles searched, I omitted the research articles that was not concern of research objectives. All total based on the tiger conservation plan goals, I found 19 research articles were published. Where, much of the information were focused goal first of conservation plan. Tiger and prey information were available in 2009, 2010,2011, 2012 and 2013. Among these years 2009 and 2013 three research articles were found to support the first goal of conservation plan (Figure 7). Second goal of tiger conservation action plan was habitat management, where maximum (four) number of research articles were published during 2013 (Figure 7). Conflicts and resolution were the third goal of tiger conservation action plan where, three and one research articles were published in 2008 and 2012. During 2008-2013 no research articles that support the goal of fourth and fifth of tiger conservation action plan (2008-2013) were published (Figure 7).

Figure 7: Research articles published on five different goals of tiger conservation action plan 2008-2013 between 2008-2013

Research articles (2014-2020)

Research articles that support the goal of tiger conservation are more in number than the year between 2008-2013. All total I reviewed the forty- two research articles that provides supporting information for the goals of tiger conservation action plan (2008-2013). During 2014-2020 few research articles are published in anti-poaching and anti-trafficking operations and transboundary cooperation (Figure 8). Twenty-six research articles were found that support the information on tiger and prey information from 2014 to 2020 (Figure 8). Similarly, eleven and eighteen research articles were found that provide information for habitat management and conflicts resolution (Figure 8).

Figure 8: Research articles published on five different goals of tiger conservation action plan 2008-2013 between 2014-2020

Discussion

Action plan needs to be rational, comprehensive, and achievable. Data related to the past research are not included in the conservation plan. Low score on each goals components issues, strategies and activities might be linked with limited engagement of conservation practitioners, and organizations (Maas et al. 2019), including lack of trans disciplines regarding methods, tools, and approaches. As this may be related with the availability of research articles published to support the action plan. As same trends of research in population ecology, diet preference with molecular study being low (Griffiths & Dos 2012). Being the less developed countries, this is obvious that lack of innovative technology could not be easily adapted, but the research was also found in confined sectors in 2007-2013. Whereas, in year between 2014-2020 research encompasses the broader sectors including all five goals, with a greater number of research articles published.

This dearth will certainly hamper the conservation action plan for species management as much information area not known to make a certain framework. Despite this, appropriate assessment criteria for the action plan of species have not been formulated which could results in ineffective management of species (Walsh et al. 2012). Issues, strategies, and activities of conservation plan seems achievable but are not quantified. This might lead problems in the success of the achievement of the goals of tiger conservation action plan. Increase in tiger number is not only an indicator of success of the tiger conservation plan. Rather other issues of habitat management, conflicts, poaching might be in the hidden forms. Conserving tiger in the heterogenous landscapes needs special consideration, where the disparities in research articles publication before and after the conservation action plan of 2008-2013 was observed. However, there are the increasing numbers of scientific research that support the five different goals of tiger conservation action plan. Although, I do not have assessed the recent tiger conservation action plan 2016-2020, however inclusion of the research findings from research articles published between 2014 to 2020 on the same 2008-2013 tiger conservation action plan might add more score weightage as the issues, strategies, and activities would be more quantitative.

This sort of measurement criteria will help to limit the implementation gaps in status of action plan of species. Different subjects' matter in the research should be forwarded, to overcome the implementation challenges (Wright et al. 2020). Including of qualitative data on the tiger conservation action plan helps to measure the completion of task, support evidence-based decisions, weaken the decision gaps and fill the gaps in qualitative mapping with robust learning in future (Mahajan et al. 2019).

Conclusion

Limitation exists in the assessment on this conservation plan of 2008 to 2013 because of my subject expertise, working experiencing, individual assessment however the plan has been completed but this sort of work is required to trace the success of conservation in future. Conservation action plan should be given with appropriate figures and times to trace the failure and success of conservation plan. With this success and failure, we will achieve the concrete results. For example, with increase in tiger population conflicts is likely to increase. For that with increase in tiger population expectation of conflicts and the way to mitigate that conflict, with increasing certain percentage of intact habitat, increase in prey base, alternative livelihood should be correlated with each other.

Lastly more research on different goals of tiger conservation action plan is required to enhance the effectiveness of conservation plan.

Acknowledgements:

I would like to thank my tutor and former students for assisting me during this review work.

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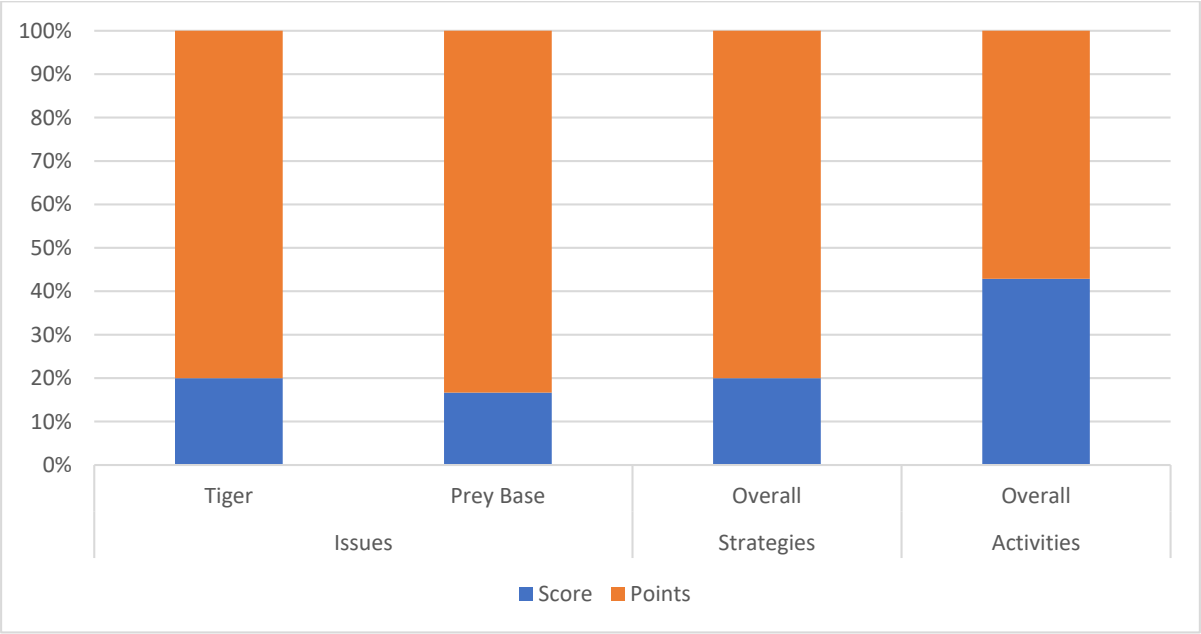

Figure 9: Score and point for Issues, Strategies and Activities of goal 1

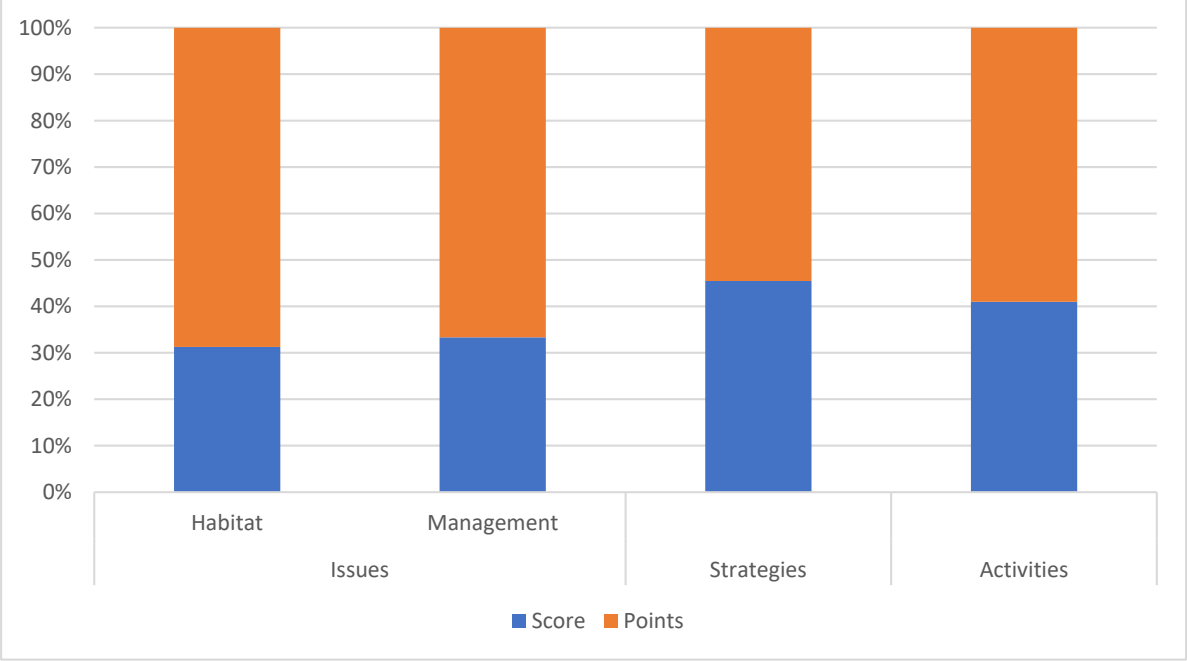

Figure 10: Score and point for Issues, Strategies and Activities of goal 2

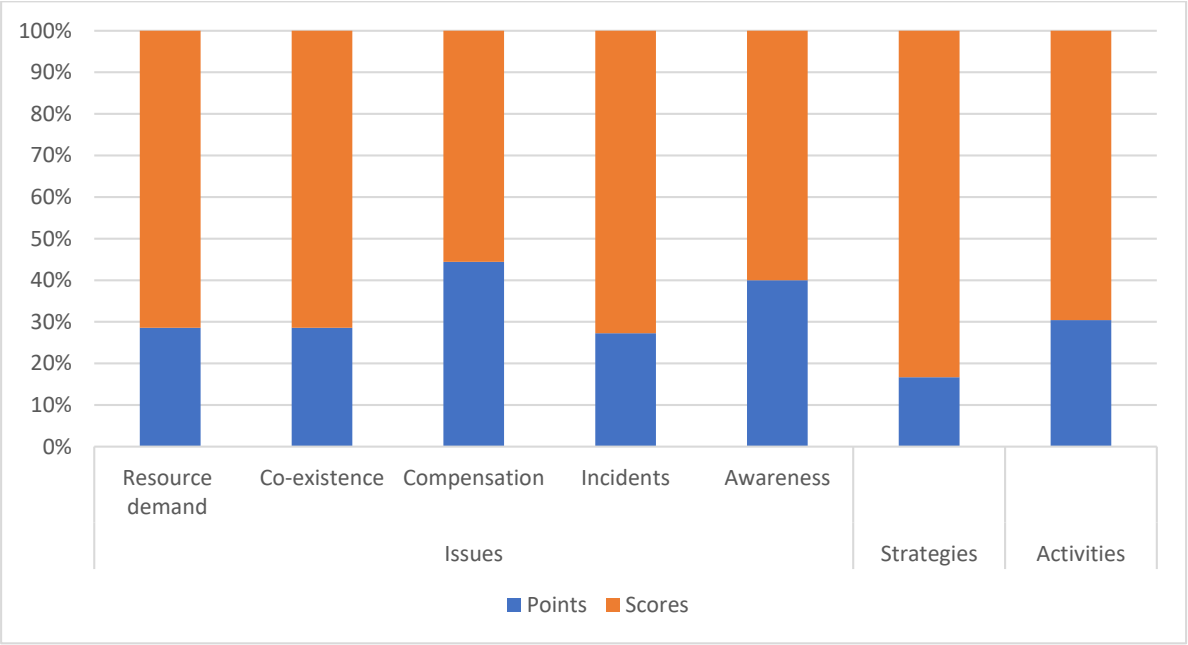

Figure 11: Score and point for Issues, Strategies and Activities of goal 3

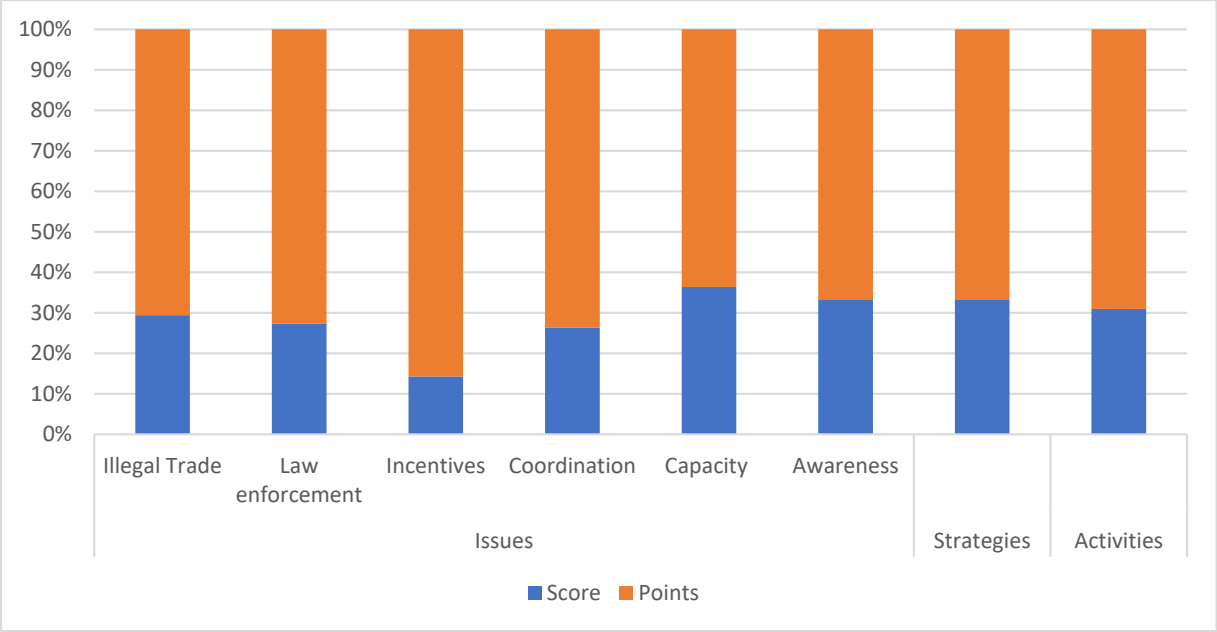

Figure 12: Score and point for Issues, Strategies and Activities of goal 4

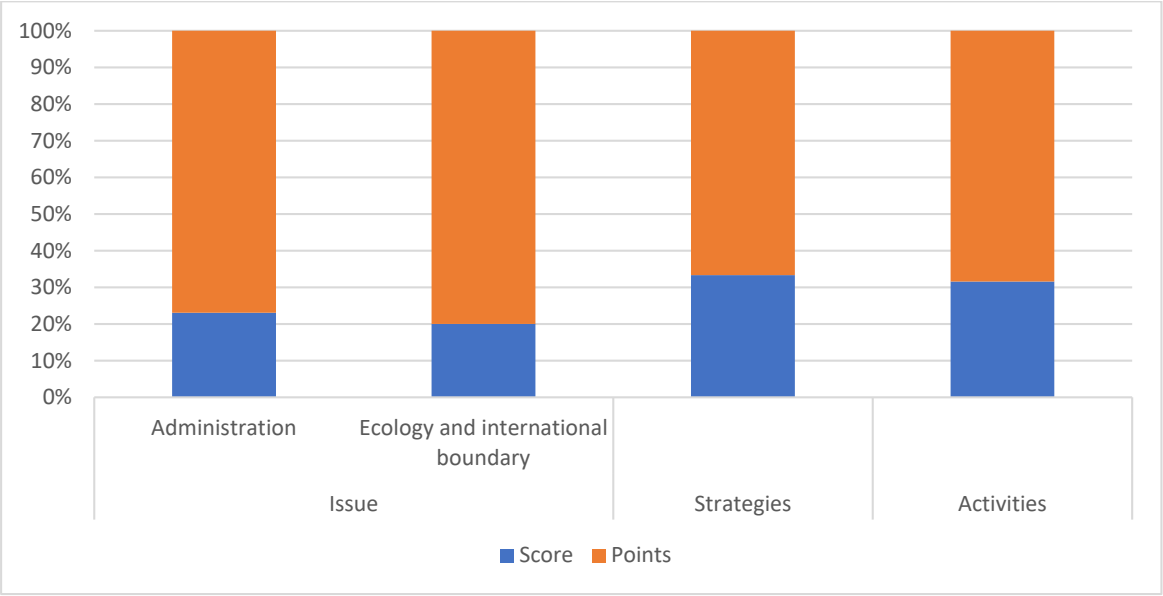

Figure 13: Score and point for Issues, Strategies and Activities of goal 5

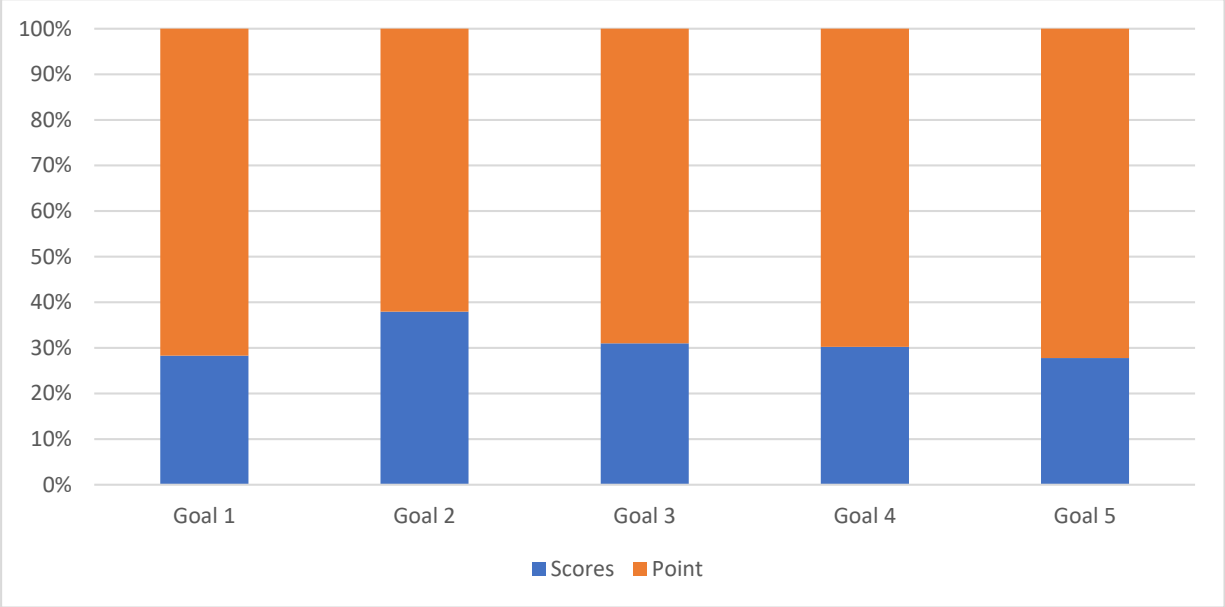

Figure 14: Score and point for all five goals of action plan 2008-2013

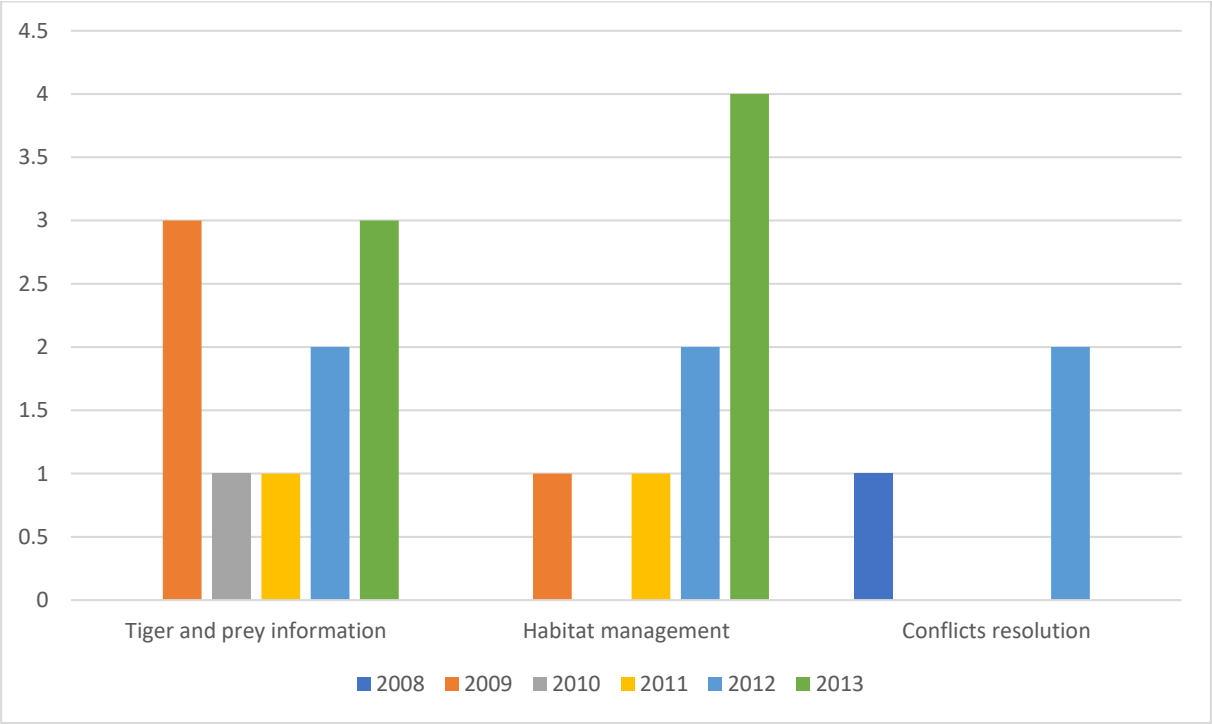

Figure 15: Research articles published on five different goals of tiger conservation action plan 2008-2013 between 2008-2013

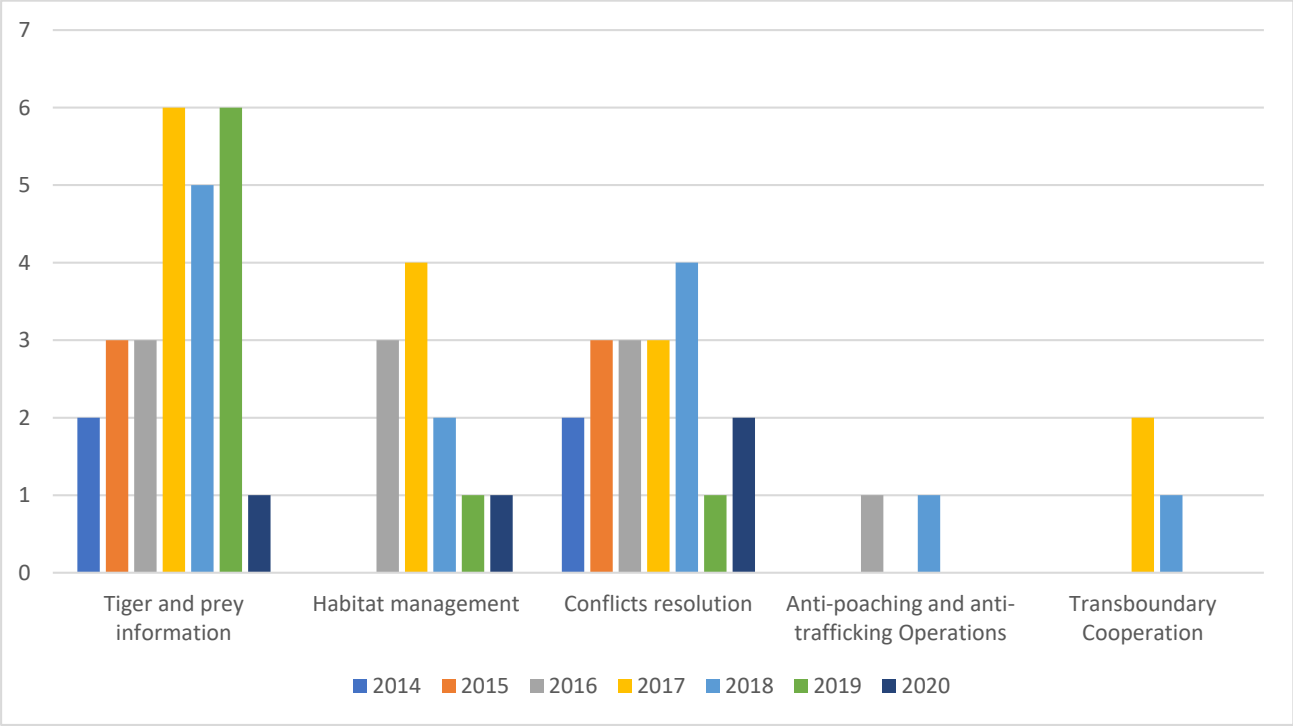

Figure 16: Research articles published on five different goals of tiger conservation action plan 2008-2013 between 2014-2020