Challenges and best practices to assist in addressing rhinoceros poaching and horn trafficking: How these could be reflected upon in the report on rhinoceroses prepared in accordance with paragraph 7 of Resolution Conf. 9.14 (Rev. CoP17) for the Conference of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

Executive Summary

1. At its 18th meeting the Conference of the Parties to CITES adopted Decision 18.115 on Rhinoceroses (Rhinocerotidae spp.) as follows: *"The Secretariat shall, in consultation with interested Parties and the African and Asian Rhino Specialist Groups of the Species Survival Commission of the International Union for Conservation of Nature (IUCN/SSC) and TRAFFIC, explore options to reflect on challenges and best practices to assist in addressing rhinoceros poaching and rhinoceros horn trafficking in the report prepared for the Conference of the Parties in accordance with paragraph 7 of Resolution Conf. 9.14 (Rev. CoP17) and prepare recommendations for consideration by the Standing Committee, at SC74"*[1].

2. The Secretariat subsequently contracted the International Union for Conservation of Nature (IUCN) to support this work. A consultation process was initiated, and as a first step in the process, the African Rhino Specialist Group (AfRSG) and Asian Rhino Specialist Group (AsRSG) conducted a survey focusing on rhinoceros (rhino) range States and other specialists in addressing rhino poaching and trafficking within the specialist groups.

3. This initial survey has been concluded, and in consultation with the CITES Secretariat it was agreed to conduct further surveys engaging CITES Management Authorities in range and consumer States as well as other interested Parties. The results of these further surveys will be incorporated in the report to the Conference of the Parties in accordance with paragraph 7 of Resolution Conf. 9.14 (Rev. CoP17), to further reflect on challenges and best practices to assist in addressing rhino poaching and rhino horn trafficking in the report.

4. The initial survey solicited examples of key challenges and best practices associated with poaching (*i.e.* the killing of rhinos) and trafficking (*i.e.* the illegal trade in rhino products).

5. Specialist Group representatives for Asian (66.7% of three) and African (75.0% of 12) range States responded representing 99.9% of White and 99.9% of Black Rhinos in Africa, as well as 82% Greater One-horned, 100% Javan and 100% Sumatran rhinos in Asia.

6. The most commonly referenced **poaching challenges** ($n = 77$) included general law enforcement, communities and governance, as well as trade and financial sustainability. However anti-poaching initiative examples ($n = 66$) were, compared to poaching challenges, disproportionately focused on law enforcement. These included animal and habitat security, the use of technological tools (*e.g.* drones) that enhance enforcement by rangers and the investigation of small crimes. Respondents deemed that only 53.4% of anti-poaching initiatives were successful.

7. For **trafficking challenges** ($n = 46$), general law enforcement, law enforcement that targets criminal networks and syndicates, and collaborative cooperation between different law enforcement agencies within and between range States were reported at similar frequencies. Compared to trafficking challenges, there was a disproportionate lack of initiatives addressing collaborating cooperation, socio-economical, and some law enforcement challenges. Respondents deemed 45.7% of initiatives aimed at curbing trafficking as successful

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[1] https://cites.org/sites/default/files/eng/dec/valid18/E18-Dec.pdf

8. The poaching and trafficking examples were consistent with previously reported and peer-reviewed published reflections that included aspects such as the need for improved integrity and reduced incentives for corruption as well as other enabling aspects including political support and financial sustainability. Some new insights, however, emerged. For instance, examples highlighted the benefits of true co-management, accountability, responsibility and participation in decision-making by local communities. Additionally, deployment of dedicated and focused task teams illustrated improved successes in apprehension, prosecution and convictions.

9. The various inputs provided by survey respondents and reflections from previous work allowed the **identification of 12 key poaching and trafficking challenges and 29 key responses**. These are preliminary results pending augmentation from additional survey data and consultation with CITES Parties.

Key Challenges and Initiatives

Challenge	Initiative
1. Efficient provision of security to rhinos through anti-poaching responses	Develop and implement integrity management systems that focus on building proud trustworthy staff while acting swiftly and fairly on ranger involvement.
	Appropriately resource rangers with training, equipment and well-being support systems inclusive of equitable and fair employment conditions.
	Resize large protected areas into optimal zones achieving anti-poaching efficiency.
	Compliment anti-poaching rhino security initiatives with rhino monitoring protection initiatives.
	Develop and implement an integrated regional safety and security strategy beyond the boundaries of parks focusing on societal well-being inclusive of rhinos as well.
2. Effective investigations, intelligence gathering and sharing	Improve awareness and implementation of existing transnational forensic sampling and data sharing initiatives.
	Develop and/or enhance existing national and regional coordination of information associated with rhino crimes.
	Develop and enhance the use of technology including facilitating legislative changes.
3. Adequate deterrence effect of prosecution	Develop and implement community policing strategies.
	Develop and implement support to improve prosecution processes.
	Develop and implement appropriate legal sentencing sanctions.
	Develop and implement asset seizure complimentary approaches.
4. Integrity at various levels across the illegal supply chain	Develop and implement integrated anti-corruption strategies that focus on addressing systemic corruption, including amnesty periods, and building a proud trustworthy staff complement while acting swiftly and fairly on involvement in corruption.
5. Understanding and responding to the dynamics of the consumer market	Develop and implement National Illegal Wildlife Trade Strategies in consumer countries.
	Develop and implement market research and consumer branding tools from other disciplines for evidence-based insights to inform interventions while sharing findings.
	Use an adaptive management approach embedded in behaviour change theory that are culturally appropriate to develop and implement initiatives aimed at reducing illegal demand, as well as monitoring and evaluating activities.
	Facilitate the development and implementation of platforms for meaningful engagement between producing range States and consumer countries at the producer and consumer level.
6. Contrasting conservation ideological expectations associated with trade in rhino horn	Facilitate processes of discussions between rhino range States, consumer countries and global influential countries inclusive of non-government organizations and across stakeholders by using combinations of scenario setting techniques and expert methods such as Delphi techniques.
7. Appropriate influence on policies	Develop and implement scenario planning including consequences of expected and unexpected outcomes on the wellbeing of people and species alike.
	Facilitate and advocate for the development and implementation of meaningful participation by principally affected stakeholders as part of an inclusive approach to develop policies.
8. Adequate local community support	Develop and implement meaningful consultation processes using adaptive planning techniques to achieve common socio-economic-ecological objectives for regions where people live next to protected areas.
	Develop and implement co-ownership and responsibility with local people including decision-making and implementation of anti-poaching and curbing trafficking strategies.
	Facilitate and advocate the development of local economies that includes enhanced infrastructure and services improving establishing many small businesses connected to each other and adding value to locally produced products.
9. Political will and support	Use the existing political multi-lateral arrangements to place rhino conservation and the contribution to the well-being of people on the agenda.
	Facilitate multi-lateral engagements between Asian countries and African range States on environmental risks and opportunities.
10. Adequate communication and messaging	Develop guidelines for the establishment of appropriate communication strategies and implementation thereof for rhino range States and consumer countries aimed at range of stakeholders that has varied impacts on the achievement of rhino conservation initiatives.
11. Appropriate conservation capacity	Facilitate and encourage re-aligning and providing resources for enhancing rangers' as well as other officials' responsibilities towards the full spectrum of conservation activities.
12. Funding sustainability	Develop and implement diverse funding mechanisms that embrace the broad spectrum of threats to biodiversity values as well as benefits from biodiversity values associated with rhinos.

1. Introduction

The world's rhinoceroses (rhinos) remain at peril. During the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) CoP18 meeting, specialists reported that African rhinos comprising two white and three black rhino subspecies declined from an estimated 26,165 individuals in 2012 to 23,562 individuals in 2017. By 2017, specialists noted a minimum of 3,693 Asian rhinos comprising the one-horned, Javan and two subspecies of Sumatran rhinos[2]. Of concern is that rhino populations in key range States experienced further declines since CoP18. For instance, South Africa, which remains the primary contributor to African rhinos, reported 14,410 white rhinos and 1,900 black rhinos in 2020[3], which represents 7.7% and 7.1% declines respectively, compared to the 15,625 white and 2,046 black rhinos reported for 2017.

Although various factors such as biology, environmental conditions and global environmental change drivers like climate influence rhino population dynamics, illegal harvesting remains the key determinant of declining global rhino trends. Recognizing the challenges posed by poaching and rhino horn trafficking CITES Parties adopted Decision 18.115[4] at CoP18: *"The Secretariat shall, in consultation with interested Parties and the African and Asian Rhino Specialist Groups of the Species Survival Commission of the International Union for Conservation of Nature (IUCN/SSC) and TRAFFIC, explore options to reflect on challenges and best practices to assist in addressing rhinoceros poaching and rhinoceros horn trafficking in the report prepared for the Conference of the Parties in accordance with paragraph 7 of Resolution Conf. 9.14 (Rev. CoP17) and prepare recommendations for consideration by the Standing Committee, at SC74"*. The IUCN SSC's African Rhino Specialist Group (AfRSG) and Asian Rhino Specialist Group (AsRSG) prepared this report with contributions from TRAFFIC and support of the CITES Secretariat.

Poaching is the unlawful taking of wild animals including the illegal acts of catching or killing a rhino without a license or permission or hunting in protected areas[5], which are often for obtaining valuable parts, specifically horns. Trafficking "*involves the illegal trade, smuggling, poaching, capture, or collection of endangered species, protected wildlife, derivatives or products thereof.*"[5] Poaching is thus one element of wildlife trafficking, and for the purpose of this report, we focus on trafficking of rhino horns their derivatives and products.

In this report, we summarize results of survey responses, while briefly discussing comparative supporting information from other sources to highlight responses to various existing and emerging challenges. The report to CoP19 in accordance with paragraph 7 of Resolution Conf. 9.14 (Rev. CoP17), will include additional responses to the survey from CITES Management Authorities from range and consumer States and other interested CITES Parties, the latter identified with the help of the CITES

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[2] Emslie RH, Milliken T, Talukdar B, Burgess G, Adcock K, Balfour D, Knight MH. 2018. African and Asian Rhinoceroses – Status, Conservation and Trade. A report from the IUCN Species Survival Commission (IUCN SSC) African and Asian Rhino Specialist Groups and TRAFFIC to the CITES Secretariat pursuant to Resolution Conf. 9.14 (Rev. CoP17). COP18, Doc 83.1, Annex 2. Available at https://www.traffic.org/site/assets/files/12220/african-asian-rhinos-iucn-traffic.pdf

[3] Ferreira SM, Dziba L. 2021. Where are rhinos safest? *South African Journal of Science*, 117(9/10), Art. #11300. https://doi.org/10.17159/sajs.2021/11300

[4] https://cites.org/sites/default/files/eng/dec/valid18/E18-Dec.pdf

[5] Criminalization of wildlife trafficking – Definitions. https://www.unodc.org/e4j/en/wildlife-crime/module-3/key-issues/criminalization-of-wildlife-trafficking.html

Secretariat, and with results from a consultative session with range States at an upcoming meeting of the AfRSG scheduled to take place in early 2022.

2. Methods

Members of the AfRSG (12 range States of Botswana, Chad, eSwatini, Kenya, Malawi, Mozambique, Namibia, Rwanda, South Africa, Tanzania, Uganda and Zambia) and AsRSG (3 range States of India, Indonesia and Nepal) received a survey questionnaire on 16 October 2021 (Appendix 1). Surveys were also sent to other members of the AfRSG and AsRSG that comprised specialist scientists, policy makers, non-government supporters, and experts within TRAFFIC.

The questionnaire asked respondents to provide reflections on successes and failures relating to rhino poaching and trafficking, perspectives on the reasons for these outcomes, and insights on what kind of changes respondents would consider, if any (Appendix 1). Respondents were also asked to provide examples of five key challenges they perceive as the most threatening to achieve the objectives of rhino conservation as they relate to poaching and trafficking. Additionally, respondents were asked to list key initiatives that could address the identified challenges associated with combating poaching and trafficking and what the likely success or failure would be.

Examples of initiatives as well as challenges provided by respondents can contain many different tactics, activities and interventions (n = 46; Appendix 2). The input provided by respondents was used to identify which of the 46 tactics, activities and interventions a specific example corresponded to (Appendices 3-6 for detailed assignment to each survey response), and are presented for the four thematic questions (*i.e.* poaching challenges, anti-poaching initiatives, trafficking challenges, and initiatives to curb trafficking). Frequencies are differentiated between responses from range State representatives and other respondents (*i.e.,* experts who are members of the specialist groups or from TRAFFIC).

3. Results

Nine African (75.0%; Botswana, Chad, eSwatini, Mozambique, Namibia, Rwanda, South Africa, Tanzania and Zambia) rhino range States responded and provided extensive information within examples on various aspects associated with poaching and trafficking challenges and initiatives. For the AfRSG, eight additional responses were received from the members who are experts that do not serve as range State representatives. We also conducted in-person and email discussions with two additional members of the AfRSG. In total, input was received from 29.4% of the 34 members of the AfRSG excluding those acting as range State representatives.

For the AsRSG, no input was received from the range State representatives. Two members that do not represent range States, however, provided insights for two of the three Asian range States (India and Indonesia). We received three responses from members of TRAFFIC. We also received input from three experts that were not members of the AfRSG or AsRSG, nor were they associated with TRAFFIC.

This report is therefore focused on rhino range States that are members of the AfRSG and the AsRSG, and the report to CoP19 in accordance with paragraph 7 of Resolution Conf. 9.14 (Rev. CoP17) will include additional information derived from consultation with range and consumer countries and other interested Parties as stated above.

3.1 Anti-poaching

Range State representatives listed 48 examples of **challenges** associated with curbing rhino poaching, while other representatives listed an additional 29 challenges (Fig. 2, Appendix 3). Generally law enforcement across the entire supply chain (an element within 12 examples), perspectives on conducting a legal trade (n = 12 examples), community participation (n = 12), improving socio-economic opportunities for people (n = 11), enabling governance oversight (n = 12) and financial sustainability of initiatives (n = 14) were most frequently associated with anti-poaching challenges. Collaborative cooperation (n = 9) and appropriate staffing (n = 9), particularly at localities where rhinos live also emerged as notable challenges.

Respondents listed examples of challenges associated with enabling requirements such as dealing with corruption at various scales (n = 1), political will and support (n = 5). Seven examples flagged legislative support as a challenge, and one linked to inappropriate policies. These, together with the enabling governance oversight already highlighted, present an important reflection of requirements for improved political, legislative and policy support.

A second broad aspect of enabling challenges was working together through collaborative cooperation, communication and consultation including across States. For instance, some range States provided examples of challenges associated with specialized forensic capabilities that limits investigations, while others flagged challenges associated with transporting rhino samples collected from crime scenes across international borders because of international (CITES) regulations as key obstacles that impose on efficient investigations despite guiding processes initiated by CITES[6].

The third broad aspect of enabling challenges associated with capacity in terms of establishing appropriate staffing at various levels across the supply chain. Four examples linked with staff integrity challenges, while five examples flagged inadequate equipment to achieve anti-poaching objectives as key challenges.

While there was a range of anti-poaching challenges relating to support across different scales (*e.g.* cooperation, capacity and sustainable financing), examples of key **initiatives** listed by respondents focused on protection and enforcement aspects, with few initiatives focusing on addressing the important enabling challenges (Fig. 2; Appendix 4). Respondents provided 66 examples (48 provided by range States, 18 by other respondents) of which 39 linked to a law enforcement element, mostly associated with tactics, activities and interventions at the places where rhinos live.

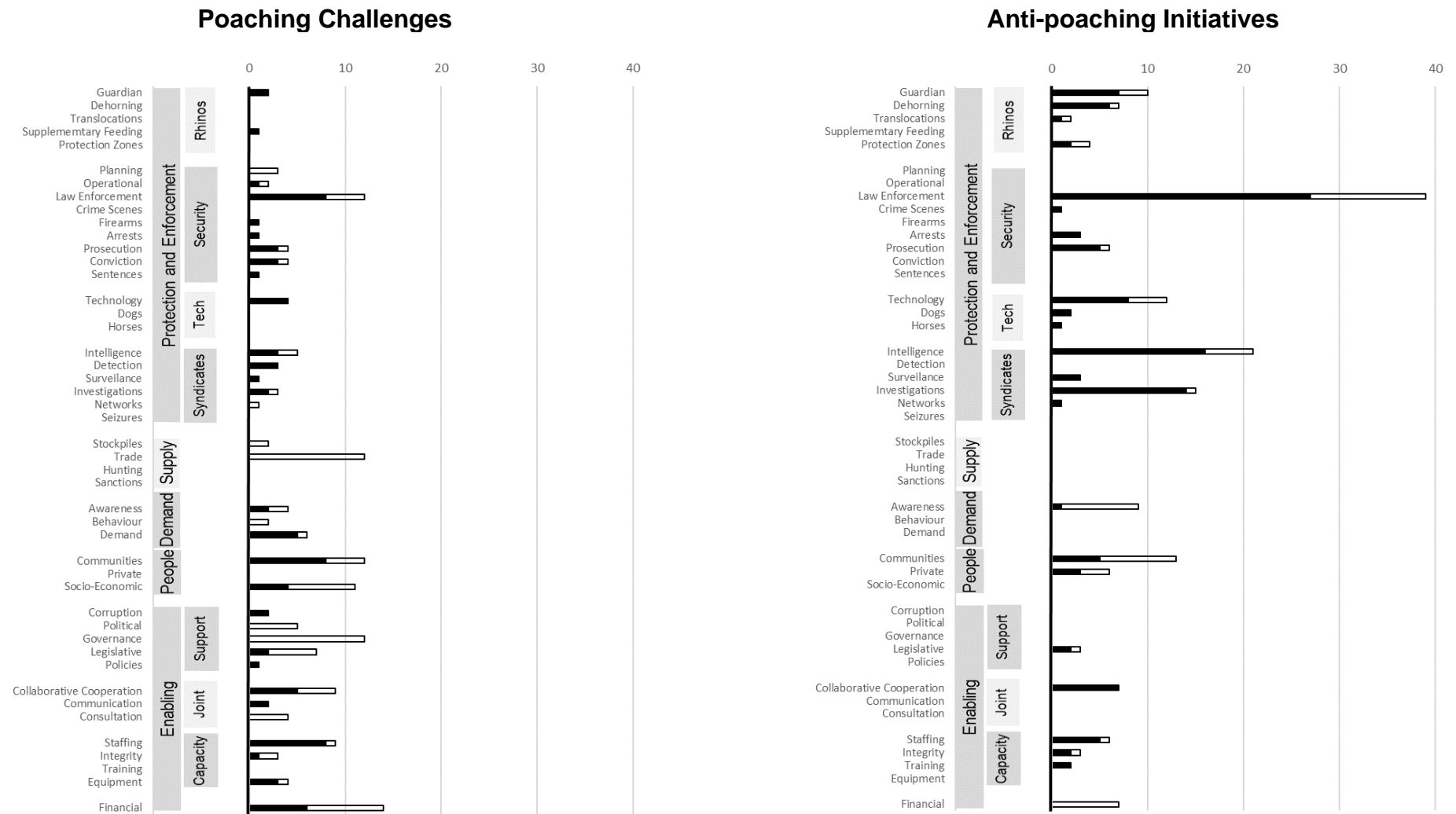[6] https://cites.org/sites/default/files/eng/com/sc/73/E-SC73-20.pdf

Figure 2. Frequencies of survey responses categorized into key elements contributing to and challenges and best practices (initiatives) in addressing rhino poaching. Frequencies represent examples provided by range State representatives (solid bars) and by other respondents (open bars).

Strengthening intelligence (n = 21 examples) was commonly cited followed by pursuing investigations (n = 15), community participation (n = 13) and the intensive monitoring and hence guarding of rhinos (n = 11). Some examples included pro-active measures, such as intelligence-based investigations; and reactive measures and the transformation of the regular ranger corps into tactical anti-poaching forces.

Respondents provided 28 examples of partial success and 33 of complete success. Success factors tend to associate with enabling elements (such as political support, whole government involvement) inclusive of support at various scales, cooperation, adequate capacity and financial sustainability. Some law enforcement initiatives such as canine deployment, air surveillance and use of alternative technologies, including drones, continue even though respondents deemed success as partial, primarily because of inappropriate staffing and challenging financial sustainability. Initiatives that were more successful included an approach that integrated various government departments in proactive arrests of potential poachers as well as the arrests of kingpins in one example. Other examples highlighted the role of meaningful community participation in the co-development of tactics, activities and interventions resulting in substantial reduction in poaching incidences and the growth of rhino numbers. These highlight the importance of cooperative approaches at various scales of government and local people.

Of the total 63 examples (45 range State examples, 18 other examples) where respondents reflected on achievement of objectives, two failed. Poachers continued to kill rhinos despite the dehorning of nearly all of them in one example. Respondents, however, did not provide a reflection on why this failure took place. A second example highlighted that efficient guarding of rhinos could benefit from robust tracking devices.

The majority of respondents to the questionnaire provided **recommendations** for improvements. The proposed improvements, however, were informally adaptive[7]. Learning, however, could benefit from having a theory of change[8] or mechanisms framework[9] informing what the outcome or impact of an intervention could be. Few of the reflections indicated some formal theory of change, although initiatives often carry implicit assumptions. Even so, learning and reflections could benefit from informal and formal evaluations, reflected by some of the improvements suggested by respondents.

3.2 Trafficking

Range State representatives listed 25 **challenges** related to curbing trafficking, with 21 additional examples provide by other respondents (Fig. 3, Appendix 5). Respondents provided 12 examples that linked to collaborative cooperation including between agencies and States. This reflected on various aspects of exchanging information as well as conducting joint operations. The second group of challenges focussed on disrupting criminal networks (n = 10 examples), while nine examples included challenges associated with law enforcement. Challenges associated with international cooperation included unclear diplomatic channels, extradition processes,

[7] Roux DJ, Foxcroft LC. 2011. The development and application of strategic adaptive management within South African National Parks. *Koedoe*, 53(2):1-5.
[8] Rice WS, Sowman MR, Bavinck M. 2020. Using theory of change to improve post-2020 conservation: A proposed framework and recommendations for use. *Conservation Science and Practice*, 2(12):e301.
[9] Gaylard A, Ferreira S. 2011. Advances and challenges in the implementation of strategic adaptive management beyond the Kruger National Park-making linkages between science and biodiversity management. *Koedoe,* 53(2):1-8.

the processing of samples to extract DNA following seizures, and the sharing of information.

Issues around the legal trade of rhino horn emerged as challenges in nine examples. These included the status of rhino horn stockpiles within range States, and in particular, different perspectives on what effective policies for stockpile management could be. In addition, it was noted that stockpile reporting to CITES is not consistent.

Similar to poaching, most examples of **initiatives** to curb trafficking (n = 38; 25 range State examples, 13 other examples) related to law enforcement including gathering and sharing of intelligence (n = 10 examples), or trying to dismantle local and trans-national trafficking networks (n = 12). Some examples focused on the assets itself through devaluing the benefit a poacher may receive by dehorning rhinos (n = 2), management of rhino stockpiles (n = 7), and several aspects associated with direct law enforcement activities (n = 2).

Apart from dismantling criminal networks through robust shared intelligence, examples of initiatives also included detection (n = 3), surveillance (n = 2) and investigation (n = 5) actions. Six examples had legislative initiatives to help address the threats posed to rhinos by criminal syndicates. For instance, one range State implemented legislation to regulate national legal rhino horn trade that also provide legal disincentives for illegal trade, while also publishing norms and standards for the marking of rhinos and rhino horn and for the hunting of rhinoceros for trophy purposes.

For those 35 examples where participants in the survey provided reflections on achieving objectives, two were unsuccessful, 17 had partial success, and 16 complete successes. Often, critical success factors would associate with appropriate cooperation. Another initiative that was given as an example was the unintended consequences of regulations; for example, the restrictions on exporting and importing of biological material under CITES[10] and Convention on Biological Diversity[11] regulations that imposed limits on submitting DNA samples for inclusion in the RhoDIS systems of DNA profiling from one country to another where the specialist DNA laboratory was located. CITES provided scientific exchange exemption and simplified procedures[12] that could address this example.

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[10] Reeve R. 2014. Policing international trade in endangered species: the CITES treaty and compliance. Routledge.
[11] Rosendal GK. 2013. The convention on biological diversity and developing countries. Springer Science & Business Media.
[12] https://cites.org/sites/default/files/eng/com/sc/73/E-SC73-20.pdf

Trafficking Challenges
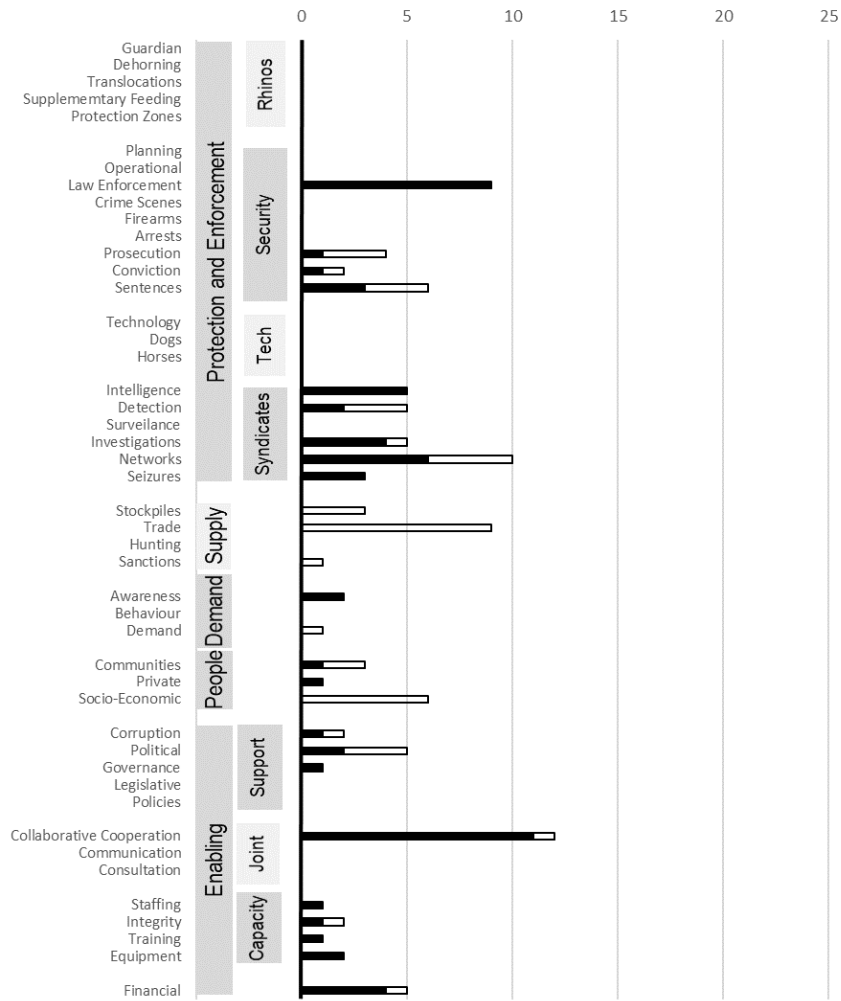
Curbing Trafficking Initiatives
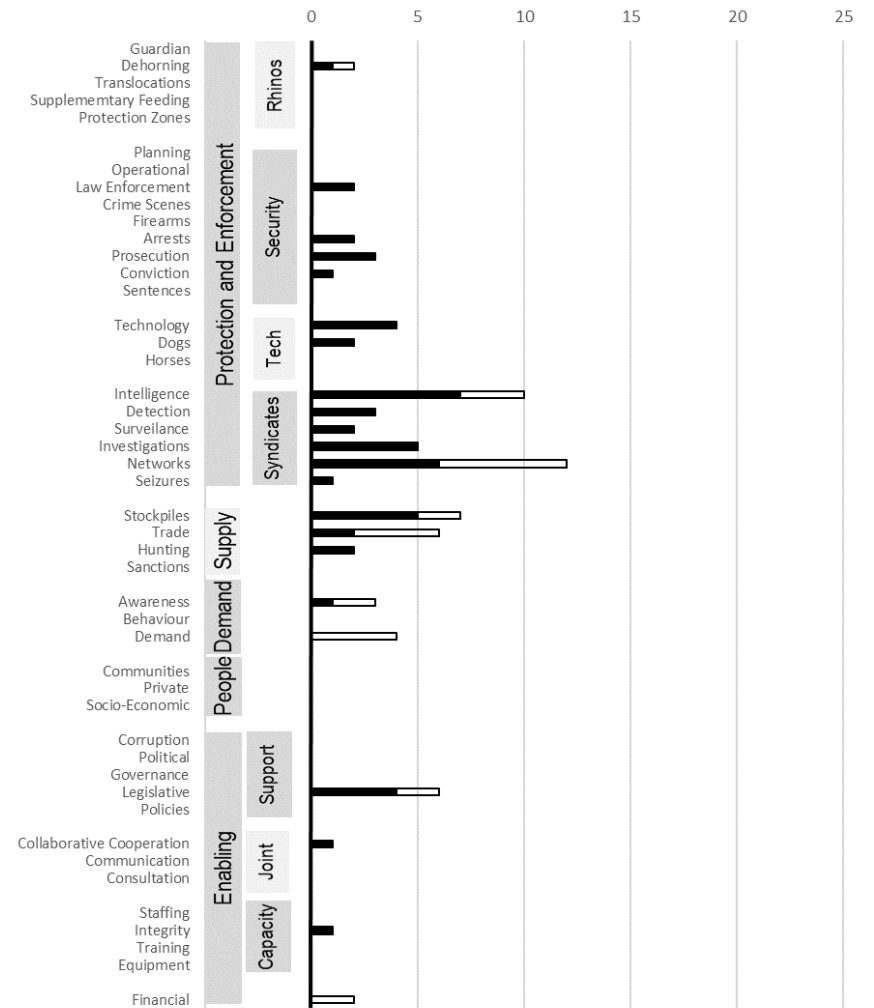
Figure 3. Frequencies of survey responses categorized into key elements contributing to and challenges and best practices (initiatives) in addressing rhino horn trafficking. Frequencies represent examples provided by range State representatives (solid bars) and by other respondents (open bars).

4. Synthesis of key challenges and initiatives

Many of the challenges and initiatives identified in this survey, were noted in previous work (*e.g.*, reports, tool kits, published literature and specialist expertise). These included several workshops since 2000 – for example Giant's Castle in South Africa[13], Nairobi in Kenya[14], Dinokeng in South Africa[15] – as well as specialist group meetings of the AfRSG[16] as well as the AsRSG[17]; challenges previously identified in the report to CoP18 in accordance with paragraph 7 of Resolution Conf. 9.14 (Rev. CoP17)[18]; and peer-reviewed literature.

Similar to this survey's results, previous results focused mostly on challenges associated with inadequate law enforcement. The latter is a key element in several guidelines and best practice tools available to help address poaching and trafficking challenges. Other challenges that were consistent included ensuring financial sustainability to implement initiatives; difficulties in ensuring political will; a need for effective communication; ineffective regulatory and enforcement bodies; and corruption and non-supportive government policies. Addressing these challenges can improve anti-poaching responses as well as initiatives aimed at curbing trafficking.

Using the challenges and initiatives reported on in this survey as well as supportive information from previous works, a set of 12 challenges and 29 associated responses was identified. It is noted that some initiatives may address more than one challenge and in these cases the categorisation focused on the most prominent challenges that an initiative would address.

Challenge 1: Efficient provision of security to rhinos through anti-poaching responses

A key element is the integrity of rangers within sites where rhinos live. Ranger well-being challenges, such as adequate housing and relaxation, contributes to vulnerability to social pressures and exposure to exploitation by criminal syndicates. Adequate and appropriate equipment and resources are key elements, associated with training requirements that require improvements. In addition, access control, situational awareness and knowledge of rhinos are key success elements. A key element is an assumption that intensifying focus on poachers and perpetrators increase perceived risks for poachers. Insights highlight the additional need for capable guardians focusing on the rhino asset itself. An additional element is the unintended consequences of anti-poaching such as continued poaching threats fuelling a growth in the security industry. Five initiatives can address this challenge (Table 1).

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[13] Emslie, R.H. 2001. Proceedings of a SADC Rhino Management Group (RMG) Workshop on Biological Management to meet Continental and National Black Rhino Conservation Goals. Giant's Castle, KwaZulu Natal, South Africa. 126pp.

[14] Ferreira S, Okita-Ouma B. 2012. A proposed framework for short-, medium-and long-term responses by range and consumer States to curb poaching for African rhino horn. Pachyderm, 51: 52-59.

[15] Balfour D, Shaw J, Banasiak N, le Roex N, Rusch U. 2018. Proceedings of the second Rhino Science and Management Meeting. Mongena Lodge, Dinokeng Game Reserve, South Africa. Unpublished report, WWF-SA. 77 pp.

[16] Most recent

[17] Most recent

[18] Emslie RH, Milliken T, Talukdar B, Burgess G, Adcock K, Balfour D, Knight MH. 2018. African and Asian Rhinoceroses – Status, Conservation and Trade. A report from the IUCN Species Survival Commission (IUCN SSC) African and Asian Rhino Specialist Groups and TRAFFIC to the CITES Secretariat pursuant to Resolution Conf. 9.14 (Rev. CoP17). COP18, Doc 83.1, Annex 2. Available at https://www.traffic.org/site/assets/files/12220/african-asian-rhinos-iucn-traffic.pdf

Challenge 2: Effective investigations, intelligence gathering and sharing

Intelligence is at the heart of disrupting illegal supply chains, both at a local and transnational scale. Forensic information associated with crime scenes is not easily and timeously available partly because of only a few specialist facilities, and partly because of inadvertent consequences of CITES despite simplified procedures for exemption of scientific exchange[19], as well as other international and veterinary regulations that restrict submission of samples to analytical facilities. In addition, within and between countries, inadequate cooperation in sharing information and forensic evidence hinders investigations and subsequent legal procedures. In some range States, the use of some technologies such as cell-phone tracking is limited. Often technology associated with detecting contraband at ports are lacking. Three initiatives can address this (Table 1).

Challenge 3: Adequate deterrence effect of prosecutions

Generally, the perception is that convictions and sentencing are too slow or inadequate to act as deterrents. This then translates to ineffectiveness of arrests, especially with lenient bail conditions. These perceptions embed in assumptions that arrests and legal sanctions through sentencing act as appropriate deterrents to participate in crime. This perception contrasts the insights from law enforcement extracted from other fields, which indicate that decentralizing law enforcement is a key element of effective crime prevention. Four initiatives can address this challenge (Table 1).

Challenge 4: Integrity at various levels across the illegal supply chain

Corruption plays out when individuals with compromised integrity use their positions or access to certain information or tools to achieve illegal gain for themselves or friends. Illegal supply chains typically have corruption playing out at various levels. Key challenges arise when corruption is systemic within government structures, as well as at local scales within sites where rhinos live in range States. A key element is the ability of criminal syndicates to adapt innovatively to new rules and regulations. Insights suggest that addressing systemic corruption requires providing amnesty and processes for corrupt officials to come clean without consequences, while also proactively building and enhancing the integrity of officials with swift consequences for compromised or corrupt officials. One initiative can address this challenge (Table 1).

Challenge 5: Understanding and responding to the dynamics of the consumer market

The purposes of use of rhino horn in consumer countries may change overtime, along with key consumer States taking part in the illegal trade. Understanding market dynamics is a key aspect, and additional research is needed to better understand context-specific consumer motivations, in order to better target behaviour change interventions. Parts of the challenge might stem from the fact that relying on consumer surveys may provide biased data compared to actual behaviour, particularly when

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[19] https://cites.org/sites/default/files/eng/com/sc/73/E-SC73-20.pdf

associated with illegal commodities. Four initiatives can address this challenge (Table 1).

Challenge 6: Contrasting conservation ideological expectations associated with trade in rhino horn

Contrasting conservation ideologies dichotomize between animal welfare philosophies and owner rights on best approaches as it relates to legalizing trade. An ongoing debate involves the opening of international trade in the high value commodity of rhino horn to fund conservation and maintenance of population. Pro-traders argue further that legal trade will undercut the illegal supply chain, but those favouring trade bans argue that legal trade will sustain and not satisfy demand, and will thus stimulate continued poaching. Often these varying responses require strong governance ensuring safe and secure environments irrespective of initiative. A key unintended consequence is that these at times contentious discussions may distract focus from addressing other pressing challenges. One initiative can address this challenge (Table 1).

Challenge 7: Appropriate influence on policies

International agreements place great value on evidence-based decisions. Often, in the face of incomplete information, opinions held by influencers that have limited mandates or responsibility for the rhino assets dictate lobbied decisions. In addition, stakeholders that live with the costs of rhino conservation have little if any influence on decision-making. Similarly, within some range States, consultation in the development of policies at times, marginalize principally interested and affected stakeholders. This can result in policies and decisions that do not have the approval or support of the principally affected stakeholders, particularly when decisions did not go through a rigorous evaluation of the potential consequences. An additional element is the lack of meaningful oversight in holding countries accountable. Two initiatives can address this challenge (Table 1).

Challenge 8: Adequate local community support

In many range States people living next to protected areas often carry the biggest costs of past and present conservation actions. These range from displacement from land used historically to ongoing conflict with wildlife. Ownership rights are key elements that result in local communities often feeling alienated from neighbouring protected areas. Engagements with local communities using a conservation lens typically are focusing on the desires of the conservation agencies, rather than a focus on a collective desired outcome. In addition, in some range States, areas where people live next to protected areas have major infrastructure and service delivery challenges, often a consequence of past and present social injustices. These conditions together with an absence of a diversity of economic opportunities, place local people at risk of exploitation by criminal syndicates for various purposes. Three initiatives can address this challenge (Table 1).

Challenge 9: Political will and support

In some range States and consumer countries, non-supportive policies, often the absence of policies, pose some limits on addressing a broad spectrum of challenges. One aspect is changing societal conditions that could lead to political conflict. This realized in some range States. In addition, unclear risks and opportunities associated with the increasing influence of Asian countries in African range States beyond the conservation realm. Two initiatives can address this challenge (Table 1).

Challenge 10: Adequate communication and messaging

Communication spans all areas of responses to poaching and trafficking challenges. Particularly challenging is media framing dynamics that play out with messages that stakeholders, whether in range States or consuming countries, finally hear and understand contrasting the intention of messaging. Such unintended media processes impact on cooperation between various entities and levels of governments. One initiative can address this challenge (Table 1).

Challenge 11: Appropriate conservation capacity

The impact of poaching on rhino populations resulted in many protected areas over-investing in anti-poaching initiatives. This often comes from redirecting existing conservation resources away from fire control, water management and species monitoring. In addition, increasingly governments decrease conservation funding while focusing on other societal priorities. One initiative can address this challenge (Table 1).

Challenge 12: Funding sustainability

Financial sustainability was a key element that range State representatives and other respondents re-iterated through the responses to the questionnaire. This aligns with concerns flagged in previous workshops associated with political conflict and civil war that could reduce revenue currently generated through tourism and directed to rhino conservation. The global government responses to the COVID-19 pandemic illustrated vulnerability of tourism-dependent conservation models[20]. Most activities addressing challenges across the poaching and trafficking supply chain of rhino horn and other illegal products depends a great deal on donor funding models. In some range States funding also have a state tax basis, while many rely on income generated through the tourism industry. One initiative can address this challenge (Table 1).

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[20] McCleery RA, Fletcher Jr RJ, Kruger LM, Govender D, Ferreira SM. 2020. Conservation needs a COVID-19 bailout. *Science*, 369(6503):515-516.

Table 1. A set of preliminary challenges and initiatives identified from survey responses and previous work (*e.g.*, reports, tool kits, published literature and specialist expertise).

Challenge	Initiative
1. Efficient provision of security to rhinos through anti-poaching responses	Develop and implement integrity management systems that focus on building proud trustworthy staff while acting swiftly and fairly on ranger involvement.
	Appropriately resource rangers with training, equipment and well-being support systems inclusive of equitable and fair employment conditions.
	Resize large protected areas into optimal zones achieving anti-poaching efficiency.
	Compliment anti-poaching rhino security initiatives with rhino monitoring protection initiatives.
	Develop and implement an integrated regional safety and security strategy beyond the boundaries of parks focusing on societal well-being inclusive of rhinos as well.
2. Effective investigations, intelligence gathering and sharing	Improve awareness and implementation of existing transnational forensic sampling and data sharing initiatives.
	Develop and/or enhance existing national and regional coordination of information associated with rhino crimes.
	Develop and enhance the use of technology including facilitating legislative changes.
3. Adequate deterrence effect of prosecution	Develop and implement community policing strategies.
	Develop and implement support to improve prosecution processes.
	Develop and implement appropriate legal sentencing sanctions.
	Develop and implement asset seizure complimentary approaches.
4. Integrity at various levels across the illegal supply chain	Develop and implement integrated anti-corruption strategies that focus on addressing systemic corruption, including amnesty periods, and building a proud trustworthy staff complement while acting swiftly and fairly on involvement in corruption.
5. Understanding and responding to the dynamics of the consumer market	Develop and implement National Illegal Wildlife Trade Strategies in consumer countries.
	Develop and implement market research and consumer branding tools from other disciplines for evidence-based insights to inform interventions while sharing findings.
	Use an adaptive management approach embedded in behaviour change theory that are culturally appropriate to develop and implement initiatives aimed at reducing illegal demand, as well as monitoring and evaluating activities.
	Facilitate the development and implementation of platforms for meaningful engagement between producing range States and consumer countries at the producer and consumer level.
6. Contrasting conservation ideological expectations associated with trade in rhino horn	Facilitate processes of discussions between rhino range States, consumer countries and global influential countries inclusive of non-government organizations and across stakeholders by using combinations of scenario setting techniques and expert methods such as Delphi techniques.
7. Appropriate influence on policies	Develop and implement scenario planning including consequences of expected and unexpected outcomes on the wellbeing of people and species alike.
	Facilitate and advocate for the development and implementation of meaningful participation by principally affected stakeholders as part of an inclusive approach to develop policies.
8. Adequate local community support	Develop and implement meaningful consultation processes using adaptive planning techniques to achieve common socio-economic-ecological objectives for regions where people live next to protected areas.
	Develop and implement co-ownership and responsibility with local people including decision-making and implementation of anti-poaching and curbing trafficking strategies.
	Facilitate and advocate the development of local economies that includes enhanced infrastructure and services improving establishing many small businesses connected to each other and adding value to locally produced products.
9. Political will and support	Use the existing political multi-lateral arrangements to place rhino conservation and the contribution to the well-being of people on the agenda.
	Facilitate multi-lateral engagements between Asian countries and African range States on environmental risks and opportunities.
10. Adequate communication and messaging	Develop guidelines for the establishment of appropriate communication strategies and implementation thereof for rhino range States and consumer countries aimed at range of stakeholders that has varied impacts on the achievement of rhino conservation initiatives.
11. Appropriate conservation capacity	Facilitate and encourage re-aligning and providing resources for enhancing rangers' as well as other officials' responsibilities towards the full spectrum of conservation activities.
12. Funding sustainability	Develop and implement diverse funding mechanisms that embrace the broad spectrum of threats to biodiversity values as well as benefits from biodiversity values associated with rhinos.

Acknowledgements

Appendix 1. The questionnaire provided to range State representatives and various specialists.

1. Initiatives aimed at combatting rhino poaching

What was the initiative? *Focus on key ones*	What was the objective?	Was the objective achieved? Yes/No/Partially	If not, why not? If so, why? *Key elements of success or failure.*	What worked and what did not work?	If needed, what could be done differently?

2. Initiatives aimed at combatting horn trafficking

What was the initiative? *Focus on key ones*	What was the objective?	Was the objective achieved? Yes/No/Partially	If not, why not? If so, why? *Key elements of success or failure.*	What worked and what did not work?	If needed, what could be done differently?

3. Identification of key challenges affecting rhino poaching and ways to address those

What are up to five key challenges to address in terms of addressing poaching?	What are the best ways to address those challenges?	What is the chance that authorities can address those challenges in the short term i.e. the next three years? Good/Partially/Not	What are the reasons that enhance or constrain the ability of rhino managers to address those challenges?	If successful, what would the impact be on rhino conservation outcomes?

POACHING: Indicate the basis of the information that informed the insights highlighted above

Personal Experience	Management data	Project Reports	Consultant or NGO Reports	Scientific Publications	Other

4. Identification of key challenges affecting rhino horn trafficking and ways to address those

What are up to five key challenges to address in terms of addressing horn trafficking?	What are the best ways to address those challenges?	What is the chance that authorities can address those challenges in the short term i.e. the next three years? Good/Partially/Not	What are the reasons that enhance or constrain the ability of rhino managers to address those challenges?	If successful, what would the impact be on rhino conservation outcomes?

RHINO HORN TRAFFICKING: Indicate the basis of the information that informed the insights highlighted above

Personal Experience	Management data	Project Reports	Consultant or NGO Reports	Scientific Publications	Other

5. Optional information

Name:	
Focal area of involvement in rhinos:	
Additional notes and comments:	

Appendix 2. Definition and interpretation of elements of tactics, activities and interventions used to categorize initiatives and challenges provided by range State representatives and other respondents.

Element	Meaning
Arrest	The action of seizing someone by legal authority and taking him or her into custody.
Awareness	The action of raising knowledge or perception of a situation or fact.
Behaviour	The action seeking to changing people's attitudes, beliefs and perceptions of social norms.
Collaborative Cooperation	The action of involving two or more parties working together towards the same end.
Communication	The action of imparting or exchanging of information by speaking, writing, or using some other medium.
Community	Reference to actions that influence or include a group of people living in the same place or have an aspect in common.
Consultation	The action or process of formally consulting or discussing a matter with interested and affected stakeholders.
Conviction	A formal declaration by a jury verdict or the decision of a judge in a court of law that someone is guilty of a criminal offence.
Corruption	The action of dishonest or fraudulent conduct by those in power, typically involving bribery.
Crime Scene	Activities at a location that associated with a committed crime holding physical evidence related to an investigation.
Dehorning	The action or process of removal of horns or the process of preventing their growth.
Demand	Activities that influence the total quantity needed across all consumers in a market for a given good.
Detection	The action or process of identifying the presence of something concealed.
Dog	Using a dog suitable by size, breeding, or training for useful work such as tracking and detection.
Equipment	Providing the necessary items for a particular purpose as well as the process of supplying someone or something with these.
Financial	The processes to enhance of maintain the finances of an organization or individual.
Firearm	An activity of confiscating any type of gun designed for any individual to readily carry and use.
Governance	The action or process of overseeing the control and direction of a State or an organization.
Guardian	The action of a person who protects or defends something typically through dedicated observation and monitoring.
Horse	The action of using a horse chiefly for labour such as ranger patrols or pulling carts.
Hunting	The practice of seeking, pursuing and capturing or killing wildlife or feral animals.
Integrity	Reference to actions that influence the quality and process of achieving being honest and having strong moral principles.
Intelligence	The action and process of obtaining information concerning an enemy or possible enemy of an area or object.
Investigation	The action of investigating something or someone through a formal inquiry, systematic examination or research.

Element	Meaning
Law Enforcement	The action of implementing the law by the agencies and employees responsible for public order and safety.
Legislative	The process of officials that have a mandate and power to make laws and establish policies.
Network	Actions that investigate and influence sets of connected people connected supporting the commission of illegal acts.
Operational	The action of engaging in, or connecting with execution of plans of an organization to achieve certain goals.
Planning	The process of deciding in advance what to do in future, how to and what is needed to achieve that.
Policies	Defining principles of action adopted or proposed by an organization or individual as the basis of decision-making.
Political	Activities relating to government or public affairs of a country that influence the intension or desire of officials.
Private	Actions that influence a community of people where persons of commercial companies own or control assets
Prosecution	The action of instituting and conducting legal proceedings against someone in respect of a criminal charge.
Protection Zone	The action of focused and dedicated provision of predetermined levels of security in a well-defined area.
Sanction	Implementing threatening penalties, usually at the international scale, for disobeying a law or rule.
Seizure	The action and process of capturing someone or something using force such as illegal wildlife products.
Sentence	The action of punishment assigned to a defendant found guilty by a court, or fixed by law for a particular offence.
Socio-Economic	Activities relating to or concerned with the interaction of social and economic factors influencing the well-being of people.
Staffing	The action and process of providing an organization with appropriate staff.
Stockpile	The action of having an accumulated stock of goods held in reserve for use at a time of shortage or other emergency.
Supplementary Feeding	The action of providing additional feed containing energy, protein or vitamins and minerals.
Surveillance	The action of careful watching a person or place because of a crime that took place or may take place.
Technology	The practical use of science or knowledge to solve problems or invent useful tools to enhance key tasks.
Trade	The action of buying and selling goods and services as a legal commercial transaction.
Training	The action of teaching a person a particular skill or type of behaviour.
Translocation	The action and process of moving something from one place to another.

Appendix 3. Examples of challenges associated with addressing poaching and suggested responses provided by respondents. We identify an example as one provided by a range State representative (R) or a specialist (S). We also indicate the elements that an example contains that were used to tally frequencies in Fig. 2.

R/S	Challenge	Potential Response	Success Potential	Success or Failure Factors	Impact on rhino conservation	Elements
R	Attain community participation in rhino anti-poaching strategies from people living adjacent to rhino areas	Be efficient at addressing human-wildlife conflict for these communities.	Partially.	Financial constraints leading to resource limitation to meet customer expectation.	Community will take great interest in protecting the animals and report any suspicious activities.	Communities Socio-economic
R	Establishing effective cross border communication of law enforcement agencies	Initiate engagement at highest level (bi-national commission) since it involves sharing of security information	Good	Bi-National commissions are good for engagement, however there remains gaps in engaging meaningfully on such strategies. Engagement has to be improved.	Cross border sharing of information timeously that will either deter poaching from happening or enhance evidence collection for successful prosecution.	Cooperation
R	Having Legislative Body and Judiciary that understand the importance of species conservation.	Workshop legislators particularly environment committee of cabinet and judiciary on rhino conservation issues. This should be done at regular intervals as there is turnover of individuals at that level after every elections.	Good	Conservationists can leverage on Cabinet minister of Environment, Natural Resources Conservation and Tourism.	More punitive legal instruments may be approved by legislature and the Judiciary will have a broad and balanced view in dealing with poaching cases as these more often than not do not have the kind of explicit evidence that one may demand in court.	Legislative
R	Lack of strong forensic capabilities	Develop strategic partnerships that can enhance the member state's forensic capabilities.	Partially	These are done but never progress with the urgency required dealing with the crisis. New thinking, judiciary operate as independent arm of the constitution.	Successful prosecution of poaching cases.	Investigations
R	Lack of strong forensic capabilities	Explore the possibilities of having regional/international courts that can deal with poaching or as a bare minimum explore mechanism with which evidence collected in one country can be used in courts of neighbour countries for purposes of successful prosecution.	Poor	New thinking, judiciary operate as independent arm of the constitution. Lobbying and initial discussion for such prospects may be started.	This may act as a deterrent for potential poachers. More likely to pick kingpins at a higher rate, the removal of kingpins will disrupt syndicate more compared to picking on field based poaching operatives.	Convictions
R	Loss of value of live animals	Allow true value of live animals to be realised as assets to owners. Strictly controlled legal horn trade must be considered	Not- animal rights movements have undue influence	Policies dictated by laws. Some countries subject to over regulation and bureaucratic smothering	Increase range expansion. Increase rhino numbers. Improve protection effort and spend. Increase investment in rhinos and their habitats	Financial
R	Risk vs reward. Equation in favour of criminals	Reverse the equation. Increase risk of arrest. Increase consequences of arrest. Mandatory custodial sentences. Conservative granting of bail only in exceptional circumstances. Speed up passage of court cases	Partially – if the corruptible opportunities can be resisted	Initiatives lie with higher authorities & politicians	Fewer criminals in jail for longer periods. Less rhino poached. Less resources spent on already arrested accused. More resources spent on prevention of poaching and working on new cases. Increased efficiency all round	Arrests Convictions
R	Sustainable funding	Broad based, independent sources of funding including natural resource utilization	Not – in Government sector good- in private sector, if given enablement by Govt.	Bureaucracy hindrances. Political priorities other than wildlife	Self-sustainability would reduce undue influence by 3rd parties agendas and insidious government budget cuts	Financial
R	Unionisation	Keep conditions of service fair and subject to strong leadership – avoid unionisation	State – not. Private sector - partially	Lack of discipline. Reduced accountability. Breakdown of discipline essential to a law enforcement force. Command structure compromised	More flexibility in responding to changing threats. Better command structures	Staffing
R	Science based crime investigation	Improve capacities, training and resource allocation	Limited	Inadequate manpower, adequate skills and resources	Laws and regulations would deter the criminals	Investigations

R	Enforcement agencies working in silos or limited collaboration	Set up a system for improved cooperation among enforcement agencies in the fight against poachers	Limited	System and policy issues	Poaching and illegal wildlife trade will be controlled	Cooperation
R	Stakeholder and Community support	Provide opportunity to the communities and stakeholders to engage and contribute actively.	Medium	Motivation and resource issues	Holistic conservation with a larger impact	Communities Law Enforcement
R	Improving ways of horn traffickers in packing the horn to transport	Continuously standardising the tools detecting horn in the sites.	A meeting for establishment of a commitment and collaborative works and the implementation of integrated measures.	The reasons enhancing the managers to address the challenges: 1. Developed collaborative actions to combat poaching and trafficking. 2. Intense communication among partners. 3. Sufficient provisions of tolls and funding for personnel of task force and field actions and law enforcement. The reasons constraining the managers to address the challenges: 1. Lack of understanding on negative impacts of rhino extinction and increased horn trafficking. 2. Less supports from local community, local leaders and government to fight poaching and trafficking; 3. Minimum sanction and punishment to poachers and traffickers.	Increased population and reproduction, contributing its healthier forest habitat and environment. Happy public with much respect to the task force of anti-poaching and trafficking, and the government gain more credit from public. Good governance in rhino conservation and forest protection. A new world on human life with much respect and supporting interaction with wild creatures in their limited space of our living planet	Detection
R	There might be any tool used by traffickers to stop the tools detecting things in and out the airport and ports.	Taking suspicious monitoring to any persons and passenger with precautionary and free prior informed concern.	Sharing views and records from policy makers and local leaders and these are sources of policy briefs made and published (share to public).	The reasons enhancing the managers to address the challenges: 1. Developed collaborative actions to combat poaching and trafficking. 2. Intense communication among partners. 3. Sufficient provisions of tolls and funding for personnel of task force and field actions and law enforcement. The reasons constraining the managers to address the challenges: 1. Lack of understanding on negative impacts of rhino extinction and increased horn trafficking. 2. Less supports from local community, local leaders and government to fight poaching and trafficking; 3. Minimum sanction and punishment to poachers and traffickers.	Increased population and reproduction, contributing its healthier forest habitat and environment. Happy public with much respect to the task force of anti-poaching and trafficking, and the government gain more credit from public. Good governance in rhino conservation and forest protection. A new world on human life with much respect and supporting interaction with wild creatures in their limited space of our living planet	Detection Surveillance
R	Hidden communication and illegal cooperation between the traffickers and workers to pass horn transported.	Provision of incentive to persons who work for combatting (task force), and awards to personnel who do extraordinary tasks.	Involvement of IT experts to refine existing tools of detection to any potential poacher and horn trafficked.	The reasons enhancing the managers to address the challenges: 1. Developed collaborative actions to combat poaching and trafficking. 2. Intense communication among partners. 3. Sufficient provisions of tolls and funding for personnel of task force and field actions and law enforcement. The reasons constraining the managers to address the challenges: 1. Lack of understanding on negative impacts of rhino extinction and increased horn trafficking. 2. Less supports from local community, local leaders and government to fight poaching and trafficking; 3. Minimum sanction and punishment to poachers and traffickers.	Increased population and reproduction, contributing its healthier forest habitat and environment. Happy public with much respect to the task force of anti-poaching and trafficking, and the government gain more credit from public. Good governance in rhino conservation and forest protection. A new world on human life with much respect and supporting interaction with wild creatures in their limited space of our living planet	Detection Technology

R	Little cooperative and collaborative actions to combat poaching and trafficking.	Frequent communication at any time of the detection tool working, if needed by putting a real time camera which can be monitored by key stake holders of combating horn poaching and trafficking, and periodic meeting and share information of tasks implemented.	Government support additional budget for implementation of above no. 1, 2 and 3.	The reasons enhancing the managers to address the challenges: 1. Developed collaborative actions to combat poaching and trafficking. 2. Intense communication among partners. 3. Sufficient provisions of tolls and funding for personnel of task force and field actions and law enforcement. The reasons constraining the managers to address the challenges: 1. Lack of understanding on negative impacts of rhino extinction and increased horn trafficking. 2. Less supports from local community, local leaders and government to fight poaching and trafficking; 3. Minimum sanction and punishment to poachers and traffickers.	Increased population and reproduction, contributing its healthier forest habitat and environment. Happy public with much respect to the task force of anti-poaching and trafficking, and the government gain more credit from public. Good governance in rhino conservation and forest protection. A new world on human life with much respect and supporting interaction with wild creatures in their limited space of our living planet	Cooperation Communication
R	Relative small punishment worn to hors poacher and traffickers.	Issuing more punishment to horn poacher and trafficker by government.	Taking initiative in form of discussion on law enforcement to combat rhino poaching and horn trafficking.	The reasons enhancing the managers to address the challenges: 1. Developed collaborative actions to combat poaching and trafficking. 2. Intense communication among partners. 3. Sufficient provisions of tolls and funding for personnel of task force and field actions and law enforcement. The reasons constraining the managers to address the challenges: 1. Lack of understanding on negative impacts of rhino extinction and increased horn trafficking. 2. Less supports from local community, local leaders and government to fight poaching and trafficking; 3. Minimum sanction and punishment to poachers and traffickers.	Increased population and reproduction, contributing its healthier forest habitat and environment. Happy public with much respect to the task force of anti-poaching and trafficking, and the government gain more credit from public. Good governance in rhino conservation and forest protection. A new world on human life with much respect and supporting interaction with wild creatures in their limited space of our living planet	Prosecutions Convictions Sentences
R	Lack of rangers dedicated to counter poaching outside the concessions or active and viable Environmental police (existing but not effective)	Reform and training of the environmental police.	Not	Lack of a dedicated wildlife crime unit to address and follow up hotpots of poaching and trafficking	More rhinos alive	Law Enforcement Staffing
R	Improved intelligence Improved communication between countries	Political commitment	Good	Many other challenges to attend		Intelligence Cooperation Communication
R	Rapid response to incursion and incidents	Have a fund dedicated to this objective specially in the countries source of poachers	Good	Lack of funds	Better counter poaching response	Law Enforcement Financial
R	Severe Budgetary constraints due to the country's economy recession.	Source alternative, sustainable funding	Partially	Limited financial resources received from Government. Must rely on sustainable donor funding.	Improved management and protection of populations	Financial
R	Bail granted to poaching suspects.	Establish a dedicated wildlife crime prosecution court to alleviate the pressure on current court roll.	Partially	Slow prosecutions and a over loaded court roll results in suspects receiving bail which constrains rhino managers.	Denial of bail would keep suspects in jail. Suspects granted bail has improved knowledge on wildlife law enforcement which increases their ability to poach in future.	Prosecutions Law Enforcement
R	Internal involvement.	Infiltrate syndicates to identify involved. Conduct polygraph tests to identify suspect individuals	Partially	Polygraph tests are not allowed for government officials in the country. Polygraph test can however be applied for NGO's or private properties.	Reduced poaching due to limited confidential information being shared.	Corruption Integrity Staffing

R	Illegal Firearms and ammunition	Reinforce the firearms and ammunitions law.	Good	Need cooperation from national police forces to reinforce the law and apply stricter control on the purchase of firearms and ammunitions	It would reduce the availability of illegal firearms and ammunitions and provide better record keeping.	Firearms
R	Staff capacity	Appoint more personnel, and train them appropriately	Partially	State finances needed for appointment of official personnel. Donor funding is an option for training.	Improved management and protection of populations	Staffing
R	Lack of equipment for monitoring and protection of the rhino species	Improving the rhino monitoring system by ensuring provision of equipment.	Partially	Lack of resources for resource protection and limited financial capacity.	Population growth and re-stocking of other National parks and Game management areas.	Guardian
R	The demand for the rhino horn	Devaluing the horn by reducing the market price	Partially	Lack of effective policies	Reduction in illegal trafficking of rhino horn.	Demand Policies
R	Inefficiency manpower to conduct law enforcement operations	To train more officers to boost manpower levels to curb the vice.	Partially	Lack of capacity building within the protected areas.	Proper management, protection, conservation and monitoring of the rhino species.	Staffing
R	Lack of transport for mobility during law enforcement activities	Provision of transport so that law enforcement activities and monitoring are spearheaded on daily basis.	Partially	Limited Resources	Rhinos well protected and the numbers will increase	Equipment
R	Loss of habitat leading to movements in search for food hence getting exposed to poaching.	Effective supplementary feeding to be enhanced so that animals are not exposed to threat.	Partially	Lack of forage due to semi-arid area	Well contained area supporting the Rhinos	Supplementary Feeding
R	High Economic value of horns	Abolish the illegal market/ trade in horns	Good	Good leadership skills, -Passionate about conservation, Hardworking and innovative, -Linkages with other local and international organizations	A healthy population of rhino in the country	Demand
R	High Unemployment levels	Job creation	Good	Employing local people around the Protected Areas	When jobs are created results in less pressure on natural resources extraction	Communities Socio-economic
R	Inadequate Funding for anti-poaching	Allocate adequate funding	Good	Prudent utilization of the scarce financial resources available	More money resonates into efficient and effective management thus; zero poaching and trade in rhino horn	Financial
R	Low staffing levels for law enforcement	Employ enough law enforcement staff	Good	Prudent utilization of the available human resource (staff)	Increased human resources intel, increased presence and coverage. Thus, no room for poaching activities	Staffing
R	Inadequate equipment for law enforcement.	Procure law enforcement equipment	Good	Strategically allocation of equipment	Adequate and advanced equipment calls for timely detection and response to situations thus; enhances protection	Equipment
R	Demand for trophy by consumer nations.	Engage consumer nations	Good	There should be room to engage	Reduced demand for horn	Demand
R	Granting of bail on suspects.	Through a constitutional right, courts should seriously look into issues of bail	Good	There is need for lobbying with the courts	Reduced rhino poaching. Rhino population growth	Legislative
R	Inadequate resources such as manpower, equipment etc.	Provide budgets that addresses the challenges	Partially	Effective patrols and ground coverage	Reduction in poaching, Population growth and new introductions	Equipment Staffing
R	Lack of information sharing due to institutional mistrust among law enforcement agencies	Improve on information sharing	Partially	Improve on communication and reduce mistrust issues	Speedy sharing of information, Disruption of syndicates	Intelligence
R	Patrolling borders	More patrols in crime hot spots	Partially	Deploy drones, Tracker dogs	More detection of criminals. Targeted deployment of anti-poaching teams	Operational
	"Disrupt" illegal rhino horn supply-chain and better control the supply systems.	Allow for a controlled horn trade	Partially -> good. While the system setup is easy, the effect may take more than three years	Most private rhino managers are already "ready" to commence on trade, and can begin almost immediately once a control system (e.g. Blockchain) has been set up.	Less poaching pressure on wild populations.	Consultation Financial Governance Trade

S	Bail conditions	Regard rhino poaching as a national economic crime with reduced bail opportunity	Good – if official/political will is developed	Lack of official/political will. Trite references to "constitutional rights" to bail when in fact bail CAN be refused, especially since it can be shown that released poachers are likely to immediately return to poaching to generate income to pay bribes & legal fees	Closure of major loophole that allows poachers on bail to benefit from inefficient judicial process that often means that their dockets get shelved	Legislative
S	Better collaboration between law-enforcement agencies	Have a structure that forces implementing officers and agents and judiciary to work more streamlined together	Partially	Corruption, poorly functioning cross disciplinary functionality and systems	More rapid convictions acting as better deterrent for criminals to approach this system	Cooperation
S	Biological management enhancement and enabling environment	Allow law abiding and conservation minded property owners to have active and enabling support to protect and manage rhino	Partially	Poor and complex provincial and/or national permitting system and policy frameworks	If enabling and supportive policy and permitting environment exists more properties would have rhino	Legislative
S	Community relationships	Change the narrative from a philanthropic model to a partnership model	Good	It is difficult to achieve unanimous support from many people simultaneously and typically economic incentives are the tangible, short-term solution whilst we work to improve livelihoods, educate, eliminate abject poverty etc.	It would become significantly more difficult to poach rhinos if communities are absolutely against it.	Communities Socio-economic
S	Consumer demand	Education, Sensitization, Social Sciences,	Partial	Geography, individuals strengths and skill-sets, financial	Reduced demand, reduces price, reduces threat = less poaching. Education takes generations and change in culture not easy.	Awareness Behaviour
S	Corruption	Develop Key Performance Indicators for law-enforcement effort – hold officials nationally and regionally accountable by reference to these (e.g. success of arrests/prosecutions). Undertake stringent court-case monitoring	Partially	KPIs need to be regionally standardized and regularly reviewed e.g. through SADC LEAP Programme and through CITES reporting by countries that are required to report on their rhino conservation efforts	More successful prosecutions, refusal of bail, spot-lighting of weak KPIs for law-enforcement effort will reduce opportunities for poachers to evade punishment.	Integrity
S	Corruption	The UN itself does not have this answer!	NOT	Human nature-greed. Wheels within wheels regarding government politics and low priority of non-vote	Success!	Integrity
S	Development of a trading "platform" like e.g. Blockchain to form the foundation of controlled horn trade	For one range State, allow the COI and an expert panel of computer scientists, law enforcement to develop a system	Good. There are 100s of similar trading platforms that can act as precedence and inspiration. There is no need to reinvent the wheel.	Emotions amongst non-range States based members of CITES prevents it from even being discussed and acknowledged as a "tool", despite 30yrs of decline under the current system. Lack of positivism and optimism, fear of making decisions	It would most likely reduce the pressure on wild rhino populations.	Financial Governance Trade
S	Economic	Spread risk through a more diversified business model	Good	Global economic influences, Policy changes (e.g. Covid travel restrictions), Capital investment requirements.	Economic resources are required to responsibly conserve rhinos. The more resources available the higher the risk one can impose on poachers.	Financial
S	Ensuring benefit from conserving rhinos are felt in IPLC in range area.	Allow IPLC sustainable "user and management" rights according to the UNDRIP and SDGs	Not -> partially. IPLC are financially and knowledge disadvantaged and need support to acquire, manage and use rhinos sustainably	Currently, hardly any IPLC has the capacity to do this.	Potentially more private small-holders anchored in IPLC acting as deterrents/buffers to wild rhino populations	Governance Socio-economic Trade
S	Ensuring that the value of live rhinos are higher than that of dead rhinos	Allow for a controlled horn trade	Good. The local authorities are their own decision makers. The CITES rules are clear for F2 generations, captive breed criteria etc.	It is ALSO a human right under the UNDRIP as well as a provision in the SDG, so there are no real legal obstacles preventing this from happening.	Most of the horns will be supplied by private breeders and the poaching pressure will decrease on wild stock. .	Financial Governance Trade Legislative
S	Intelligence led pre-emptive interventions	Have dedicated intelligence unit nationally and linked in regionally to transmit and package actionable intelligence for implementing agents to work on	Partially	Corruption and political resistance to develop such a dedicated unit	More pre-emptive interventions than having to chase criminals after a rhino crime has been committed	Intelligence Political

S	Make rhino relevant to society	Better narrative more propel centric approach	Not	Political agenda not aligned with nature based solutions/ corruption	Communities and civil society will not allow criminals to organise themselves to kill rhino	Political Socio-economic Communities
S	National & regional coordination	Ensure that SADC LEAP is upgraded into a more powerful regional structure that ensures better collaboration, with effective use of existing SADC protocols	Good – if political will can be developed	Political factors – low priority given to regional collaboration. Too much officiousness on the part of Government officials being unwilling to collaborate with NGOs, even under MoUs	Enable disruption of syndicates tor individual poachers who operate cross border	Cooperation
S	Persistent demand for rhino horn in consumer markets upholding the illegal market price, which in turn provides the incentive for the illegal trade – and therefore poaching – to continue.	Direct engagement with consumers of rhino horn products to include them as part of a collaborative solution	Not unless a change of approach is agreed upon and adopted	This is largely beyond the reach of rhino managers and will depend on the initiatives of key governments (through their relevant agencies) and NGO players working together constructively (and agreeing to modify their current approach toward consumers, which tends to be more prescriptive)	Likely to have a positive effect on reducing illegal trade and therefore poaching over time; this in turn would enable recovery of rhino populations in larger areas (e.g., Kruger National Park)	Demand
S	Political will	Develop relationships, proactive media, international political pressure	Good	Corruption, Political agendas	Actionable intelligence led mitigation measures. The high level dealers must be apprehended and prosecuted to stem the flow of money	Political
S	Prosecution and conviction of traders/traffickers INCLUDING foreign diplomats involved in it	Enforce the local national laws	Good. The laws are clear. There are lots of evidence. Politics only prevents it from taking place.	Political/financial pressure from demand countries are larger than support	Disrupts and deter illegal poaching syndicates operations --- will result in less illegally poached rhinos	Convictions Prosecutions
S	Public private partnerships	Enabling and conducive public and private partnership approaches to rhino management and protection	Partially	Distrust between private public intuitions is extreme and often work at polarised ends of each other rather than together	Private sector are far more able to adjust and support complex problem solving and having an enabling trusting relationship with each other will fast track rhino recovery	Cooperation
S	Ranger Motivation	Training, increased salaries, financial education, education support, improved living and working conditions, healthcare, increased attention and gratitude, legal support, counselling	Partial	Without significant financial education many rangers use higher basic salaries as collateral for loans from draconian banking systems and loan sharks with high interest. Soon they end up unable to pay debt and are more likely to align themselves with poaching cartels thus undermining security structures in place.	In one range State, we estimate that >90% of rhino poaching has inside involvement. These "might" be disgruntled employees or those in financial debt with no seeming way to rectify the problem. An endowment should be considered to bail out such instances.	Staffing
S	Scene-of-crime & forensic investigations	Identify & develop national & regional centres of excellence for 1.) Training law-enforcement staff in SCI process relevant to national laws, 2.) undertaking forensic analyses (e.g. ballistics, DNA)	Good – if official/political will is developed	Lack of official/political will. Spurious arguments about chain-of-evidence issues. Red tape in exporting samples for analysis	Stronger prosecution cases would deter poachers, who currently benefit from poor presentation of evidence against them in courts	Investigations
S	Sensible policy toward rhino horn stockpile management, with full cooperation of all private stockpile holders	Create incentives for holders of private stockpiles to cooperate with other parties	This very much depends on the willingness and ability of government agencies to engage effectively (with positive support from NGOs)	As above, this is not in the hands of rhino managers directly, who can only do so much to secure stockpiles of harvested horn	Securing cooperation with holders of private stockpiles would enable more inclusive forging of a solution to the illegal trade and poaching problem, ultimately to the benefit of rhino populations	Consultation Legislative
S	Strategic national planning	Develop National Rhino Strategy that includes requirements for annual reviews of KPIs	Good – if official/political will is developed	Lack of official/political will	Ensure that rhinos are managed better to achieve optimum population growth	Planning
S	To develop Standard Operating Procedures (SOP's) and Key Performance Indicators (KPI's) that staff can be held accountable. SOP's to highlight aspects of "best practice" and well established "norms and standards".	Establish a culture of accountability and draft a Strategy and SOP's that are Executive-approved to ensure compliance is mandatory.	Good – if implemented at an operational level	Sourcing the right people that are "field-experienced" to draft the SOP's is essential.	Huge positive impact on performance, especially with new staff entering the service. Levels of competence is enhanced enormously and accountability measures are simply administered through a disciplinary process if required	Operations

S	To ensure operational staffing levels are at the appropriate densities (Sq. kms per FR), with appropriate training (law enforcement and monitoring of rhino and effort)	Government needs to realise that protecting the environment and species is critically important or face localised extinctions. Political will is key.	No looking good with the call for Government to downsize its staffing levels in many instances in the civil service.	Not having the required staffing levels seriously effects patrol ground coverage (in the main), which allows poachers easier access. Risk/reward formula favours poachers if reserves don't have the required manpower resources to ensure early detection and interception	Adequate staffing levels has demonstrated a reduction of rhino poached in any given area	Security
S	To establish an appropriate intelligence capacity with "leading edge" software and database managed by a skilled person familiar with effective analysis to provide conservation managers with proactive information.	Talent spotting within the current staff establishment coupled with appropriate training from SAPS and SSA to manage handlers and informers. Outsourcing of this function has also proved effective	Partially – budget dependant.	Inadequate budget for staffing and equipment and the inability to pay informers and handlers is an issue	Intelligence and the establishment of an effective informer network are key. Remaining within the bounds of the law in this domain is crucial.	Intelligence Networks
S	To provide adequate budget for anti-poaching operations, including staff allowances such as S&T and overtime pay to ensure patrol-time in the field is maximised.	Government and NGOs to provide adequate funding.	Not looking good – government funding seriously compromised and NGO funding over-stretched.	Budget and manpower related constraints. COVID and its negative effect on tourism revenue streams have severely affected operations.	Providing adequate budget would help considerably and improve staff morale which in itself enhances motivation, commitment, effectiveness and preparedness. In many instances NGO funding has been a game-changer.	Financial
S	To provide adequate vehicles, aircraft, helicopters and equipment	Provide a suitable and appropriate budget to purchase, run and maintain all equipment	Partially – relied heavily on NGO funding	Budget constraints	It would improve the Managers effectiveness immensely.	Equipment
S	Lack of meaningful CITES oversight in holding countries accountable.	CITES decisions have mandated reporting of rhino horn seizures and stockpiles and the development of stockpile management systems as important first steps. However, failure to engage on these requirements does not result in any significant oversight pushback on offending countries. A follow-on punitive process needs to be clearly articulated and supported by CITES decision makers and enforcers.	If there is forceful leadership from the CITES Secretariat and the Standing Committee to support rhino conservation it may be possible to mark progress, but the record so far is less than encouraging. To date, at critical junctions, the Parties and the Secretariat has stepped back from holding offenders accountable in a meaningful way. It is worth noting that the same key countries have repeatedly emerged in successive reports as heavily implicated in illegal rhino horn trade.	Governments of many key countries never feel the "heat" for poor law enforcement and policy making, much less instances of internal corruption and complicity in the illegal rhino horn trade. For example, missions to one consumer State by the CITES Secretariat have mollycoddled the state of inertia and seemingly whitewashed clear instances of bad behaviour.	Progress requires the development of a culture of strict accountability, which is generally lacking within the CITES arena.	Stockpiles Trade Law Enforcement Governance
R	Cross-boundary challenges with poachers entering area from another country.	Continued law enforcement activities along the international boundary. Future, cross-country cooperation to address challenges.	Good-partially. Operating cross-boarder has numerous challenges. Law enforcement activities will continue.	Cross-border cooperation between governments is challenging.	Further securing the international boundary would maintain zero rhinos lost to poaching in Akagera.	Law Enforcement Cooperation
R	Continued poaching for bush meat in park that may have implications for rhino security including snare bycatch and opportunistic rhino poaching.	Continued law enforcement activities in park coupled with community awareness programs and enterprises in the communities around the park to dissuade poaching in the park.	Good. Many community awareness programs and enterprises are underway. Law enforcement activities will continue.	Community relations are always challenging but the park officials have worked hard to build trust and cooperation with adjacent communities. Understanding the true drivers of bush meat poaching is a challenges.	Eliminating snaring and bush meat poaching would maintain zero rhinos lost to poaching in the park	Law Enforcement Communities Awareness
R	Lack of timely information on the approach of foreign, big-game poacher	A good intelligence network	Good	A revised and enhanced intelligence strategy is being developed in conjunction with neighbouring AP projects.	If the approach of poachers of rhinos (which in this area we expect to be mostly foreigners) is known well before they reach the protected area, protection forces from both the park and the government can be mobilized before the poachers even get in the park, ensuring the security of the animals	Intelligence

R	Corruption	Building strong relations with the local judiciary and Ministry of the Environment	Good	On average, good relationship are already in place.	If a strong judicial process was in place it would act as a definite deterrent.	Corruption
R	Inadequate budget for rhino conservation	To continue persuading Government to increase budget for rhino conservation. Get partners and stakeholders (including tourists) to contribute for rhino management. To start rhino tourism in the rhino IPZs and sanctuaries. To encourage private sector to contribute for rhino conservation	Partially	In the period 2019 to date COVID-19 is the main reason. This made Government (including wildlife authorities), donors and stakeholders unable to make funds available for rhino conservation	Improved security of the rhinos. Motivated rhino staff. Improved capacity in terms of equipment and rhino monitoring technologies. Improved infrastructure (observation posts, drifts, bridges, ranger posts, mobile posts)	Financial
R	Lack of appropriate and working rhino monitoring technologies	Get donors and interested stakeholders to fund research and development of monitoring technologies that are durable with longer lifespan	Partially	Lack of funding	Improved monitoring and security of the rhino in the IPZs leading to increased populations	Guardian Technology
R	Black rhino dispersal behaviour	To confine the animals in the sanctuary. Get an appropriate and working monitoring technologies (e.g. LoRa sensors) that are durable and have longer lifespan	Partially	Lack of funding	Improved security and monitoring of the rhinos that would lead to increased populations	Guardian Technology
R	Inadequate manpower	To continue requesting Government to employ required staff. To acquire cutting-edge technologies for security and monitoring of parks and populations	Partially	Lack of funding	Improved efficiency. Motivated rhino staff. Directly improved monitoring and security of rhino populations	Staffing Technology

Appendix 4. Examples of anti-poaching initiatives provided by range State representatives and other respondents. We identify an example as one provided by a range State representative (R) or a specialist (S). We also indicate the elements that an example contains that were used to tally frequencies in Fig. 2.

R/S	Practice	Objectives	Achievement	Success factors	Failure risks	Improvements	Elements
R	Dehorning of rhinos in non-fenced areas	To deter poachers from shooting the rhinos	The objective was not achieved. Over 90% of the population dehorned.	Failure. Poachers continued to shoot the dehorned animals. The objective failed to produce the desired outcome.			Dehorning
R	Intensify anti-poaching patrols. Foot patrols and aerial patrol effort significantly increased in non-fenced areas	Have regular frequent sighting of all known animals in the area. Improve the efficiency of carcass detection and pick carcasses of poached rhinos shortly thereafter.	Yes: Animals accounted for more regularly. Yes the patrol teams started picking 3 to 4 days old carcasses (and in some circumstances hours) as opposed to previously where a few weeks old carcasses were picked with little evidence	Success. Animals accounted for, carcasses picked early and poachers followed with success in some cases. Poachers encounter prior to committing crime in some cases.	Due to dense vegetation and water situation in the habitat tracking most rhinos by spoors was not so effective and efficient. Intensified patrols coupled with surge in poaching disturbed animals especially black rhinos and the animals responded by dispersing from area demarcated as intensive patrol zone further getting more exposed to poaching risk.	Deploy monitoring devices (ideally VHF devices) in majority of the animals (~70%) before intensifying the patrols. Use of technology to augment and synchronise the human effort on the ground.	Guardian Law Enforcement Technology
R	Removal of select breeding animals to fenced area	Secure a breeding population and improve breeding rate	Yes: No losses since moving animals into fenced areas, however threats continue to increase.	Animal in a secure reasonable sized area of suitable habitat for population growth.		.	Protection Zones
R	Increase ranger force through tougher military type selection by 60% and 30% on the 2 rhino parks	Better rhino monitoring and ground cover. Increase rhino range	yes	Resources committed to the exercise and training put in place as best COVID restrictions allowed.	COVID restrictions have impacted very heavily on financial liquidity. Austerity measures have had to be implemented.	Better sustainable funding needs to be in place to encourage long term commitment to maintaining recruited positions. Tourism collapsed in face of COVID and unrest.	Integrity Staffing
R	Public offer of rewards for verified information which lends to prevention of rhino poaching/arrest of rhino poachers	Stop poaching attempts before losing rhinos / solve poaching incidents swiftly and conclusively	yes	Operations done jointly with police and strong prosecution follow up	Hoaxes and set ups have to be filtered	Increase amount offered as rewards	Intelligence
R	Working out protection efforts with locals	participation	Supports	Less engagement due to lacks of commitments and initiative from government, there is interferences from outside	Consultation public, dialogs,	Continue to do field patrol with locals	Communities Law Enforcement
R	Publish a policy brief	To have insights from key policy makers and local leaders	Understanding and supports	If not, it needs consultations and share information. If so, effective communication and strengthen supports for others	Consultation and share information can be worked, Time availability to have insight, opinions and supports for real actions	Publish all visits and consultations	Legislative
R	Real time monitoring at sites of habitat and rhino population/home range	Knowing rhino moves and other potential threats at any direct time. Check it out and directly enforce to any signs of poaching at place	Knowing directly the moves of rhinos, safe from any disturbance and potential threats	Field images and data directly known by others, which would come to poachers, These should be on the right hands of the authority	Setting tools at some sites can be worked out, and on line field information. Leaking information which come to others which used to poach	This must be implemented by certain persons/VIP secretly.	Guardian

R	Wildlife Forensics	Improve crime investigations; Use DNA to match a criminal / seizure to a crime scene / rhino	Partial as it is an ongoing process	In country it is not easy to create a database for all the rhinos from tissue / blood as it is primarily opportunistic. Dung based sampling has been adopted to prepare the DNA database which also is time consuming and laborious. Secured and adequate funding	The approach has helped investigate rhino crime cases in country. The investigation procedure has been improved by introducing a SoP and also a training module for field staff. The field staff gets changed quite often and new staff needs to be trained at short intervals.	Dedicated team / division for crime investigation should be created with permanent manpower along with provision for promotion / incentive / etc.	Investigations
R	Engaging with communities	Obtaining support for the communities towards conservation and in protection works	Partial	There needs to be a clear system for engagement as well as space should be provided to the communities to decide and contribute towards conservation. There should be a system of recognition and incentivising the good and punishing the bad by the community institutions	The approach works only if efforts are sustained.	There should be an institutional approach instead of need based.	Communities Law Enforcement
R	Establishment of the Anti-poaching Coordination Operations centre	Rapid response in support to counter poaching and incursions in the GLC. Investigations based on intelligence and handing over to prosecutors poachers detained, opening dockets and follow up. Sharing of information. Operates inside concessions when requested but mostly outside.	Yes partially	Small unit of 12 man (active 6) lack of good mobility. Lack of funds. Uncertainty. Weak Intelligence	Coordination with Private concessions and court cases. Few poachers detained when compared with data on incursions into park.	Bigger unit with at least 24 man (12 active any time) 1 more vehicle and at least 3 motorbikes.	Law Enforcement Investigations
R	Dehorning of rhinos	Dehorn any rhino that appear inside the concessions to discourage poaching. Involvement of Community leaders in the initial dehorning.	Yes . No rhinos killed in 2021.	Communities were informed rhinos don't have horns. Cooperation of private concessionaires	Coordination with private concessions.	None	Dehorning Communities
R	Develop a National Strategy on Wildlife Protection and Law Enforcement	To establish within the country, and within the framework of national laws, common approaches to the protection and conservation of wildlife and to ensure the effective enforcement of laws governing wildlife resources	Partially. Due to this being a 5 year strategy, objectives for Year 2 to 5 within the strategy are still to be rolled out and implemented	Most targets for Year 1 outlined in the action plan of the strategy have been achieved	Increased human capacity, improved data capture, investigations & intelligence, prosecutions, reporting, stakeholder coordination, established K9 Unit, implemented Conservation fee for sustainable financing, approved species management plans, established pangolin working group. Wildlife and Protected Areas Management Bill still to be endorsed by Cabinet	Faster roll out of steps to combat wildlife crime	Law Enforcement Investigations Intelligence Prosecutions
R	Establishment of the Wildlife Protection Services (WPS) Sub-Division within the Directorate of Wildlife and National Parks (including the Intelligence and Investigations Unit (IIU) under the WPS)	Establish a sub-division within the Directorate of Wildlife and National Parks dedicated to anti-poaching, law enforcement and investigations and intelligence work	Partially. The IIU was established and positions filled, however, very few of the regional WPS positions have been filled	Appointments are slow due to cumbersome approval processes and financial constraints	WPS staff recruitment process not ideal	Ensure that recruitments are done in an efficient manner	Intelligence Investigations Law Enforcement

R	Establishment of the Training School	Establish a training school for personnel	Yes	School established and training taking place	Training can be increased but budget constraints are a limiting factor. Funding needed for general maintenance costs of school.	A maintenance budget for the school is essential.	Staffing Training
R	Training of MEFT and stakeholder personnel	Train as many people in law enforcement and wildlife crime related topics	Partially. Training is ongoing.	Training is ongoing. Training: law enforcement, Scene of Crime, Prosecutor training	Financial resources are delaying training program		Law Enforcement Prosecutions Crime Scenes
R	Establish specialised units and purchase Squirrel B3 helicopter	Squirrel B3 helicopter purchased to increase aerial patrol capabilities and assist with security operations. K9 Units developed for a National Park and North West, for the North East and for the Central regions. Horse Unit developed for a National Park	Partially. Squirrel B3 helicopter purchased and operational. K9 Unit for a National Park developed. Second Unit for North East currently being trained. Third K9 unit to be developed in 2 years time. Horse Unit in planning phase.	Squirrel B3 Helicopter has increased aerial presence in most of the rhino poaching areas and assisted with carcass detection rates. ENP K9 unit has had a lot of success in and around a national park, especially during road blocks and the confiscation of illegal firearms.	Carcass detection has increased tenfold due to the MEFT Helicopter. K9 Unit has served as a deterrent in and around ENP. The sustainability of both incentives are a problem. Currently reliant on donor funding.		Equipment Law Enforcement Technology Dogs Horses
R	National Dehorning Program	To dehorn all the smaller rhino populations Nationally every second year, with the exception of one national park, to take away incentive and to audit populations	Yes	Program ongoing since 2014 when cabinet approved National dehorning. Populations that were targeted by poaching has seen a significant drop after dehorning took place.	Dehorning effective on small populations in combination with good intelligence and boots on the ground. Less effective in larger populations or populations with 50+ animals. Need to at least dehorn 80% of a population to be effective. Financially costly, especially if trying to dehorn every population every 2 years. Time consuming.	Increase staff capacity to tackle the large numbers of rhino currently in the program. The range State typically dehorn 200 – 300 rhino annually under government but need to push this number up to at least 400.	Dehorning
R	Dehorning	This was an initiative meant to combat horn trafficking by cutting the rhino horn	Yes	No poaching was done during this period hence resulting with no horn trafficking.	Dehorning worked	Use of drones for monitoring and surveillance to combat horn trafficking.	Dehorning Technology
R	Implants	For monitoring purposes especially the movements of the species.	Yes	Because animals were easily tracked, monitored and located without challenges.	Implants worked	Fencing part of the park for rhinos only coupled with provision of CCTV cameras for surveillance purposes.	Technology Surveillance
R	24/7 Surveillance and monitoring	For monitoring purposes as one way of combating horn trafficking	Yes and the initiative is still in use	Because it is a 24/7 monitoring and surveillance as such no any threat to rhino poaching for horn	The initiative is still working	Increase the fuel allocation for patrols along the park fence boundary and also use of airspace during the day.	Surveillance
R	Putting up a sanctuary with pickets around	To put the rhino in an enclosure	Yes	-Number of rhino increased, -No poached rhino recorded, -Easy monitoring around the sanctuary	The initiative worked well	Use of drones for monitoring purposes	Protection Zone Law Enforcement
R	Recruitment of more youthful staff	To increase manpower	Yes	-Number of rhino increased, -Patrol coverage increased in and around the sanctuary	The initiative worked well	More staff is the best, just need to increase the number of staff	Staffing
R	Investing in Intelligence and Investigations Unit	To increase surveillance in the community	Yes	-Timely counter suspects before killing/trading, increased informer network	The initiative worked well	Enhancement of cross boarder operations	Intelligence Investigations
R	Putting sensors and trackers on the Rhino horns	To monitor movements/distribution of rhinos	Yes	-Position/location of rhinos traced	The initiative worked well	Nothing	Guardian Technology

R	Awareness Campaigns and media coverage of court cases	Educate communities on the negative impact of poaching. Name and shame arrested poachers through media coverage	Yes	Members of the public volunteer information through the use of hotlines	a. More information on poacher movement is passed	More funds for informer rewards and recruitment through donor support.	Awareness
R	Coming up with Intensive Protective Zones and secure Conservancies	Moving rhinos into the well protected areas.	Yes	Improved protection Poachers fail to easily penetrate protected zones	De-horning as poachers target even dehorned individual	Engage consumer nations so that they create measures to reduce demand	Translocation
R	Establishment of Multi-Stakeholders crack teams focussing on intelligence-led operations	Attend incursions, follow-ups of poachers and disruption of their activities.	Yes	Most of the known profiled poachers arrested. A lot of illegal firearms were removed from circulation thereby reducing illegal activities.	The operations are ongoing and proving to be effective	Donor support on such operations is key considering the high costs involved.	Intelligence Law Enforcement
R	Infiltration of rhino poaching syndicates.	To obtain pro-active intelligence on their operations.	Partially.		Arrest were made before losses were made but outside the conservancy but it was difficult to prove the intention of poaching rhinos in the absence of evidence.	There is need to improve on intelligence so as to secure deterrent convictions even if the rhino poachers are arrested outside the conservancy/ park	Intelligence
R	Integrity test on people working with rhinos.	To determine who was abating rhino poaching from within.	Yes the objective was achieved.	It worked as corrupted employees where rooted out before any damage and insider jobs could be done. The main challenge is that these tests are expensive and thus only well-funded conservancy have the capacity whereas most rhino areas cannot afford or sustain such tests.	Employees conniving with rhino poachers were identified through integrity test. They were discharged.	Passing Integrity test should be a pre requisite before engagement and should be an ongoing excessive.	Integrity
R	Rhino ear notching and dehorning exercises.	To identify all rhinos in an area via their unique ID number. To reduce the incentive to poach by reducing available horn for sell in an effort to deter poaching.	Partially	Rhino ops are expensive and covid-19 affected funds available in most rhino areas as such the ops where not done as scheduled in most areas in the past 2 years. Previously disturbed areas make location of rhino difficult and the risk high of more disturbance as far as rhino immobilising ops are concerned such as in one national park.	Ear notching has worked as it allows for rhino monitors to account for all rhino in an area and sweeps are done to locate rhino not accounted for. Dehorning has partially worked as some poachers may still poach a dehorned rhino to get whatever horn is available.		Guardian Dehorning
R	Trained and eager rhino monitors and strategic anti-poaching teams	Rhino specific patrols and up to date rhino status and population data	Yes	A National rhino monitoring training is ongoing for all rangers in rhino areas and our rangers are all paramilitary trained. However with the establishment of new rhino areas and staff turn-over new teams should be continuously trained	Strategic rhino centred patrols proved very effective as poaching was greatly reduced	Fully equipped rhino monitors	Guardian
S	Improving public/ private/ community relationships	To ensure that all stakeholders have similar capacity and resources so that weakest links are not targeted	Partially	Relationships are something that need continued work as individuals change etc.	The Association of Private and Community Land Rhino Sanctuaries (APLRS) is a formally recognised association facilitating the interface between private and community with government stakeholders in matters rhino.	The APLRS now has an administrator working with the rhino program office to facilitate implementation of the national Rhino Action Plan (the strategy). This	Communities Private

						includes identified security actions.	
S	Optimizing asset base	To achieve the most effective combination of resources within financial parameters for unique geo, socially, politically determined parameters	Partially	The environment is consistently changing and the threat evolves	A combination of intel, fences, technological advancements, armed security, canine units, aerial assets AND community relationship building has resulted in zero poaching in 6+ years and zero rhino poaching in one range State in 2020		Communities Intelligence Law Enforcement Technology
S	Regional community scout program	Community ownership of rhino t the point of knowing each individual and community guardianship towards rhino	Partially – some poaching did take place in 2021	Outside poachers managed to influence local inhabitants so complete unity on rhino protection not yet achieved	Community pride and sense of ownership key to obtaining intelligence and support	Understanding better the infiltration of criminal elements in an otherwise coherent community approaches	Guardian
S	Integrated law enforcement efforts with stake-holders (including local communities).	To gain understanding and awareness, commitment and cooperative actions.	Supports from each others of partners, well prepared actions and supported actions.	If not, there will be no collaborative in actions and no supports gained from some of others (including local communities).	It can be worked through communication in some ways, making collective understandings, commitments and actions. Contributions from each partners would not be the same due to differences in ability and resources, but monitoring in preparations, implementation and share of results of the action would be consistent implemented.	Sharing information on negative impacts from poaching, and the extinction of rhinos. Having words from policy makers and local leaders for a policy brief of importance of combatting rhino poaching, apart from obtaining commitments through official letters from local government, local leaders and central government.	Communities Law Enforcement
S	Development of Intelligence network(s)	To receive proactive information about poaching conspiracies	Yes		Improved source handler capacity helps to filter information and ensure the integrity of intelligence. Inside involvement compromises strategies	We could outsource all intel'	Intelligence Law Enforcement
S	Experience in two range States – rhino guardianship	Regularly see rhino and have individual knowledge of black and white rhino population	Yes (no poaching in 2020/2021)		Regular presence and boundary integrity seem to be a deterrent for poachers to reach rhino	The efficiency of finding each rhino vs cost of active intelligence and proactively apprehending poachers	Guardian

S	Generic Rhino Security Programme/Strategy. Staffing, Deception testing, Leadership, Foot patrols, Monitoring (rhino & effort), Intelligence, Budget, Equipment, Infrastructure, Boundary integrity, Boundary fencing, Training, Technology, SAPS/SSA/NGO partnerships, Case management, Access control, Dehorning, Vet support. Noting that a law enforcement security programme is multidisciplinary and collectively contribute to a successful anti-poaching operation – there is no single "silver bullet!".	To provide effective protection to minimise rhino poaching mortalities from illegal hunting. (And this can be achieved through effective law enforcement, good intelligence, accurate monitoring, improved neighbour relations, diligent crime investigations and secure rhino horn stockpiles).	Partially effect in some areas and effective in some areas, especially small reserves with high patrol densities and all equipment and infrastructure provided, including aircraft, helicopters and effective boundary integrity/detection zones. Sadly, some areas experienced local extinctions due to inadequate budget and staffing. Rhino security is a very expensive business.	Budget and staffing levels constraints were an issue that affected the effectiveness of the anti-poaching operations. The importance of having an Anti-poaching Strategy cannot be over emphasised and this must be revised regularly as poachers get smarter.	It is important that all rhino reserves are provided with adequate staffing levels, which under the current level of threat is deemed to be a minimum of **one field ranger per 10-12 square kilometres** – that works and reduces rhino poaching significantly. (See notes below on pg8 on aspects that will determine patrol manpower densities). Intelligence is key to a successful law enforcement programme. Deception testing is vital to avoid internal collusion. Dehorning is effective in small populations, provided the law enforcement operations were not relaxed. Good leadership is key. Drones were not effective. Case prosecution management not great.	Supplying additional budget and staffing for field operations. Create more partnerships to assist with the anti-poaching strategy both in "kind and cash". The court processes have not been kind to the conservation staff. Case processes are slow and repeat offenders are given bail, which is very demoralising to law enforcement staff. Some cases take years to be finalised and often end badly! There needs to be a refinement in the system that manages rhino poaching prosecutions timeously and effectively.	Dehorning Integrity Law Enforcement Staffing
S	Experience from range State	Small sanctuaries well patrolled with good leadership, competence and experience and usually with electric fences	Yes in most cases since the mid-1980s numbers in such areas have increased.	Large bush areas difficult to patrol generally failed, especially if intelligence and government support was weak, and poaching increased when there was collusion with staff or former staff.	Dedicated staff with strong leadership, intelligence, adequate anti-poaching equipment, experienced staff, and ideally smaller areas with electric fences are the easiest to secure, with support from the top. Large areas / poor patrolling and poor commitment / corrupt former staff and officials involved increased poaching.	Look at areas of success and emulate them, and learn about failures too, to find patterns that work and don't work in all range States in Africa and Asia and according to the requirements of the area, i.e. avoiding silos and sharing techniques and knowledge.	Protection Zones Law Enforcement
S	Legislative changes, higher penalties, judicial capacity building and sensitization, Scene of Crime Training,	To increase the risk to poachers, increase prosecutions and achieve higher penalties	Partially	The sensitivity of training too many people is sensitive matters with the risk that they "turn".	1st & 2nd respondents on a crime scene training – need to know only worked well, The wildlife agency dedicated wildlife crime prosecutors are working well.	Our forensic capability needs to be improved	Legislative
S	Operation in conservation area from mid 1980s – early 1990s	Stop cross-border poaching of rhinos by gangs from range State	No – all rhinos remaining were poached	Density of anti-poaching staff too low. Lack of strategic planning in attempting to protect entire 10,000km² area. Impossibility of pursuing poachers into neighbouring range State.	Rescue of 300 black rhinos, translocated to other areas, of which about half survived	Concentration of anti-poaching effort in areas of high rhino density (Intensive Protection Zones) while selectively translocating rhinos from lower-density areas	Law Enforcement

S	Protection of rhinos in a conservation area	Protect and increase rhinos translocated from conservation area	Partially	Country's "fast-track land reform policy" facilitated unplanned settlement in some conservancy areas, accompanied by a surge in poaching from 1991, exacerbated by cross-border syndicates operating from another country	Significant effort by NGOs and conservancies in tackling poaching through coordinated efforts, especially by gathering intelligence to deal with poaching gangs more pro-actively than reactively. Strategic translocations of rhinos from unsafe areas. Selective dehorning.	More attention by government authorities to enforcement of scientifically-based National Rhino strategy instead of letting human factors and donor funding influences interfere with logical decision-making e.g. on where/how to conserve rhinos. Better cross border collaboration (INTERPOL has been largely ineffective).	Protection Zones Translocations
S	Technological advancements	To utilize technological advancements to improve security efficiency, and increase the risk of poaching	Partially	Economic limitations, remote area challenges	Improved communications, improved night vision/ thermal capability, remote cameras and AI, improved telemetry, LoRA, Earthranger	No one model fits all. Workshops for information sharing useful – Covid travel restrictions	Law Enforcement
S	The acquisition of National Police Reserve (NPR) status in private and community rhino sanctuaries	To ensure that RPUs are competitively armed	Yes		Repetitive training is paramount to ensure minimum standards are superseded	Singular training platforms	Law Enforcement
S	Zoos worldwide are raising awareness through various means regarding the subject combatting rhino poaching.	Engage visitors to participate / fundraise for rhino conservation projects	Partially	It is difficult to see what visitors do once they leave the zoo… but we found that a lot of funding comes in when zoos proactively encourage visitors to participate.	Good communication is key that shows where money goes to. Credibility of information are essential as this leads to credible communication (visitors.. press… fundraising)	Often zoos have various focuses (different species / topics) therefore rhino poaching is not a sole focus and will not be talked about all the time… Good campaigns (like the EAZA Rhino Campaign in 2005 / 2006) have shown that the effort to focus for 1 – 2 years on a topic may reach much more people	Financial
S	Zoos worldwide are raising awareness through various means regarding the subject combatting rhino poaching.	Engage zoo to participate in rhino conservation projects	Yes	The EAZA Rhino TAG has good opportunities to inform zoos of what projects are currently doing very well on the ground and are 'worth supporting' The EAZA Rhino TAG has the opportunity to invite guest speakers from the field or the IUCN SSG to participate in meetings and to present projects	The active engagement NGOs (like SRI and IRF) have been very useful in providing information to zoos and to facilitate partnerships between zoos and field projects. It is very important to have a trustworthy NGO at place, good partners and the approval / cooperation from the IUCN SSG.	Personally I very much encourage good cooperation between zoos / NGOs / IUCN and field partners. The better this works, the larger our credibility in helping to combat rhino poaching	Awareness Financial

S							
S	Zoos worldwide are raising awareness through various means regarding the subject combatting rhino poaching.	Inform visitors by 1) Panels next to exhibits, 2) Keeper talks, 3) Exhibits next to enclosure, 4) Press releases, 5) Social media	In how far this is actually having an impact is difficult to assess but the issue of raising awareness is working in the sense that people are aware of the issue.	It is difficult to assess the educational value of panels. But it seems that the direct contact (keeper talks, meet the rhinos, info mobile …) have a great impact to explain the subject to visitors. We also noticed a high interest by the press and the subject in often present.	Zoos have the opportunity to work with life animals and thereby can generate emotions. Having good staff adds more information and all interactive 'experiences' leave an impact	The subject is so dire that a lot of people 'loose' the trust and energy however it may be possible to combat rhino poaching	Awareness
S	Zoos worldwide are raising awareness through various means regarding the subject combatting rhino poaching.	Inform visitors by 1) Panels next to exhibits, 2) Keeper talks, 3) Exhibits next to enclosure, 4) Press releases, 5) Social media	In terms of additional fundraising for rhino conservation, YES. But in terms reducing poaching --- likely not at all.	In general, the EAZA and AZA members Zoos are usually preaching to the "converted" already, so more preaching is not likely to have any major impact on the demand from Asia.	The awareness raising in EAZA has little direct influence on the livelihoods of local poachers in the range countries.	Awareness activities need to target the demand-sector to have any meaningful impact.	Awareness Financial
S	Implementation of Rhino Task Team (RTT). It formalised some cooperation between specialised and hand-picked members from various ministries to investigate old and new rhino poaching cases.	Thoroughly investigate wildlife crimes related to high-value species, including cases registered prior to the inception of the operation. Compile, manage and analyse wildlife-crime data through the Integrated Database of Wildlife Crime in one range State. Arrest perpetrators of crimes related to high value species and dismantle criminal syndicates. Ensure contraventions are charged under POCA and other relevant legislation. Prevent criminal activity through pre-emptive interventions and deterrence. Support the prosecution of high-value wildlife crime suspects to ensure appropriate penalties for all perpetrators of high-value wildlife crimes. Support anti-poaching activities through active law-enforcement input. Ensure regular reporting of wildlife crime statistics, trends, achievements and challenges to all relevant stakeholders. Ensure broad wildlife-crime awareness creation through active communication. Form and strengthen partnerships at all levels and across boundaries	YES,	74 rhino cases were registered where suspects were arrested. A high number of suspects from old cases were arrested thanks to follow up investigations. A comprehensive National Wildlife crime data base was created under RTT. Many syndicates were dismantled, but new syndicate are being formed. The POCA charges are being used on most important cases. Over 140 suspects were arrested by RTT, thanks to great cooperation between intel agencies and boots on the ground. RTT Investigators are working hand in hand with State prosecutors to ensure adequate penalties. RTT members communicate any intel information that could guide the APU on the ground. Weekly, monthly, quarterly, annual and ad-hoc Reports are generated and disseminated to the relevant authorities and whenever requested. WC reports are communicated to the public/press every Monday. Partnerships are created across Ministries at the range State at every hierarchy levels. Cross boundaries partnerships are forming gradually with all neighbours. But with some countries like Angola, the cooperation is going at a slower pace, language barrier might be the main issue.	A multidisciplinary task team from handpicked people was a critical factor of success. Along with fast and flexible funding. A Wildlife Crime data base used by all the Ministries was an important factor to unit all law enforcement agencies within the range State. Cooperation and good channel of communication at operation level between intel agencies and operatives on the ground is crucial. Good cooperation and communication between investigators and prosecutors is primordial. Cooperation and good channel of communication at operation level between intel agencies and operatives on the ground is crucial. It is crucial to report accurately and share the credit with every single entity involved in successful operation. Public awareness is important to get the support of the civil society and fill in the vacuum otherwise occupied by negative journalism that can demoralise law enforcements. Frequent workshop and training allow stakeholder to know each other, build bridges and develop some trust. Trust is essential for every multi-agency operation.		Law Enforcement Investigations Intelligence Prosecutions

R	Dedicated rhino tracking unit housed within the law enforcement department.	To monitor all rhinos to ensure health and security.	Yes- no rhinos have been lost to poaching since their reintroduction in 2017. The population has grown since reintroduction.	No rhinos have been lost to poaching since their reintroduction in 2017. The population has grown since reintroduction with numerous calves born. The initial reintroductions showed success such that an additional five rhinos were introduced in 2019.	A dedicated monitoring team ensures that the population is intimately known and that all animals are accounted for and monitored. Home ranges, sociality, and calving is well known. Trackers are achieving more than 2000 sightings per year.	Expanding the use of aerial tracking would be useful for quickly sighting many rhinos and getting clear images for condition assessment. Currently this is prohibitively expensive and flights are only carried out for approximately three hours per week.	Guardian
R	Increasing general law enforcement patrols both in coverage, diversity, and man-days.	To ensure the security of a national park and minimize illegal activities and losses to poaching, including rhinos.	Yes- while poaching still exists, increased volume and capacity of law enforcement has reduced poaching by more than 90% on the last ten years. No elephants have been lost to poachers in the last ten years and no rhinos or lions have been lost to poachers since their respective reintroductions.	Poaching has decreased by more than 90% in the last ten years. Rangers teams have been expanded and the types of patrols have been increased (short and long ground patrols, aerial, marine, night, and K9). Man-days have increased and patrol coverage has increased greatly.	Improved training, increased law enforcement staff size, and increased man days have greatly reduced poaching in the national park. Diversifying patrol types and introducing new methods increased efficiency.	Improving understanding of high-risk zones in the park will make patrols and efforts more efficient. Expanding staff will allow for greater coverage and varied capacity within the ranger units	Law Enforcement Staffing Training
R	Increase the use of technology to support general law enforcement activities and rhino security specifically.	To support law enforcement and rhino monitoring efforts by increasing situational awareness and efficiency of activities.	Yes- new technologies to support law enforcement and rhino monitoring activities have been deployed.	EarthRanger has been deployed as a situational awareness tool that can be viewed by key management and law enforcement staff that allows for all ranger teams, tagged animals, and vehicles to be seen in the field in near-real time. Camera traps, including cameras with GSM capabilities have been utilized extensively. Fence voltage monitors allow us to detect changes in park fence voltage and detect incursions. Rhinos have VHF transmitters inserted into their horns to make ground tracking more efficient.	EarthRanger for situational awareness has increased efficiency and decreased response time to incidents. VHF transmitters in the rhinos' horns has made ground tracking more efficient.	Some technology has be underdeveloped when we have deployed it. In the future we will wait until some technology is more rigorously tested in the field to ensure it is ready for the field. Capacity building of staff to use technology needs to be more comprehensive and intensive to ensure technology is maximized.	Technology Law Enforcement
R	Due to the persistent threat posed by poaching, range State developed and implemented a holistic, integrated and multidimensional response, involving various government departments, including enforcement and intelligence agencies, customs, the National Prosecuting Authority and other stakeholders such as the private rhino owners, the hunting industry and non-governmental organisations.	To combat rhino poaching and to bring the rate of animals killed illegally down	Partially	Although different approached were followed, poaching is still happening and illegal trade in rhino horn is continuing	There were pros and cons of the National Ops Rhino. Availability of budget, intelligence and enough manpower were the issued that made it work.	Combination of national and provincial SAPS deployment to provinces where rhino poaching and illegal trade of horns takes place	Law Enforcement Private Intelligence Prosecutions Investigations

R	Because these wildlife crimes are syndicated and organised, the illegal killing and illegal trade in rhino horn are considered a priority crime in the range State. A Priority Committee was established by an intelligence committee to investigate rhino related crimes and other agencies, has prioritised the investigation of rhino killings; and the Police Service included rhino security in the Rural Safety Plan. Through collaboration the number of arrests have increased (OPS Rhino which was implemented nationally)	To combat rhino poaching and to bring the rate of animals killed illegally down	Partially	Although different approached were followed, poaching is still happening and illegal trade in rhino horn is continuing	There were pros and cons of the National Ops Rhino. Availability of budget, intelligence and enough manpower were the issued that made it work.	Combination of national and provincial SAPS deployment to provinces where rhino poaching and illegal trade of horns takes place	Investigations Cooperation Arrests
R	Pro-active measures, including intelligence-based investigations; and reactive measures, including the transformation of the ranger corps to an anti-poaching force; canine deployment; air surveillance and use of alternative technologies, including drones, will therefore continue to be implemented and strengthened.	To improve combatting of rhino poaching	Partially	Shortage of manpower, intelligence and in some instances budget		More emphasis on intelligence and closer cooperation between different sectors involved in intelligence gathering and analysis	Staffing Intelligence Dogs Technology Investigations
R	Continued bilateral engagements with neighbouring states as well as the transit and consumer states are an integral part of the response strategy. Some of these bilateral engagements reinforced mutual support and partnerships in among others, the fight against wildlife trafficking, but is not sufficient to address the ever evolving crime networks that have the	To get a truly global response with all countries participating in joint interventions and supporting one another to effectively deal with this growing crime.	Partially	Not all countries we have engaged with kept their promises of working with us – with other range State and neighbouring countries relationships grew and we are working hand in hand in the fight.	Having a person in the country of engagement whom to work with that will react when you he/she is contacted	Need nodal points for each country	Cooperation Investigations Law Enforcement Intelligence

	ability to infiltrate various areas.					
R	National Fusion Centre, National Analysis Unit, National Environmental Crime Database	Centralised repository of environmental crime information (both incidents and arrests)	Fusion Centre Established, Analysis Unit Established, Database Established, Historical information migrated and consolidated, Current information routinely captured and analysed however would consider partially achieved.		Centralised system works well: Feedback and support to IO's – case / court. Analysis on pressure, threat modus operandii. Focused Investigations – high value targets	Continue enhancing skills and internal capacity. Improved support to law enforcement teams	Cooperation Investigations Intelligence Arrests Law Enforcement
R	Remote tracking of the rhinos	Be able to follow remotely, night and day, the movement of the rhinos. On a quick schedule, this can give timely alerts for danger, injury or mortality.	No	We were unable to capture the rhino in the field, as they had no beacons (GPS or VHF) at the time. LoRa trackers, small and ideal for rhinos, are currently scares and difficult to buy.		The capture to put in GPS trackers will be tried again as soon as the tracking units are available.	Technology Guardian
R	Daily monitoring of the rhinos in the reserve	Confirm daily the good health of the rhinos, monitor signs of poachers around the rhinos, able to carry out quick reactions in case of problems	Partially	While the trackers are in the field every day, they are not always able to locate the rhinos.	VHF units in the rhino horns that helped tracking them down failed before expectations and we were unable to capture and substitute the units. Nonetheless, the fact that the trackers need to put more effort into following the tracks to find the rhinos, means that they are also covering more ground daily and more likely to find tracks of poachers, if there are any.	Change the VHF units in the rhinos more frequently, but this means more costs (vet and tracking units) and more stress for the animals.	Guardian
R	Have 24/7 protection around the rhinos to prevent any poaching	Protection of rhinos and to avoid any attempt of poaching.	Yes	We have good funding that allows us to have dedicated teams to monitor and protect the rhinos. These teams camp out in the rhino area to be at hand 24/7. The rhino population in our area seems, as of today, too small to attract the attention of organized poachers, which provides an added protection to the rhinos.	Teams are successfully tracking and protecting the rhinos as well as patrolling and controlling the area and home range of the rhinos. The chance to start small provides an easier start for the newly trained trackers and teams tasked to monitor and protect the rhinos. Their skills will be already high when the populations grows, and the poaching threat grows.		Law Enforcement
R	Have good intelligence gathering around the park to keep eyes on any potential poaching groups	Stop any rhino poaching activity before it even arrives in range.	Yes	Good relations with surrounding communities, who also have direct radio lines to inform us of any potential threat.			Intelligence

R	Dehorning	Remove the object that causes rhinos to be poached	Yes	Rhinos were dehorned upon translocation. This need to be regular.			Dehorning
R	Anti-poaching patrols in the rhino protected areas	To arrest poachers entering in the rhino intensive protection zones and in the park generally	Yes	N/A	Key was foot patrols on hilly and in the riverine areas where poachers normally hide		Law Enforcement Arrests
R	Aerial patrols (fixed wing aircraft) in the rhino protected areas	To search for poachers and liaise with ground teams for arrests	Yes	N/A	Experienced spotter who know the areas well and the kind of aircraft (Husky) used during operations	Use of helicopter that could maximize arrests. The helicopter with rangers would search areas and when poachers seen drop rangers to make arrests	Law Enforcement Surveillance
R	Intelligence support	Neutralize poaching syndicates in the villages and districts around rhino protected areas	Yes	N/A	Use of national task force/task coordinating groups including Police, Intelligence Service, Defence Force, Wildlife authorities' intelligence staff		Intelligence

Appendix 5. Examples of challenges associated with addressing trafficking and suggested responses noted by site managers and authorities. We identify an example as one provided by a range State representative (R) or a specialist (S). We also indicate the elements that an example contains that were used to tally frequencies in Fig. 3.

R/S	Challenge	Potential Response	Success Potential	Success or Failure Factors	Impact on rhino conservation	Elements
R	Corruption	Follow the money. The UN itself does not have this answer!	NOT	Human nature- greed. Wheels within wheels regarding government politics and low priority of non-vote	Success!	Integrity Intelligence Networks
R	Enhance trans-national co-operation	Diplomatic channels. Process DNA of seizures. Sharing of information. Streamline the currently near impossible extradition processes with RSA	partially	Initiatives lie with higher authorities than rhino managers	Assist with prosecution of entire criminal chain – not just individuals or segments of the syndicates	Cooperation
R	Lack of investment intelligence gathering and port control detection aids	Assist relevant law enforcement agencies where possible. Increase intel component efficiency to infiltrate syndicates and corrupted officials	Good with political will, hopeless without	Initiative lies with higher authorities than rhino managers	Increased efficiency of law enforcement effort – better targeting. Better investigated syndicated networks. Better discovery and seizure rates	Detection Intelligence
R	Non specialised prosecutions	Allocate/develop specialist prosecutors in poaching, trafficking & rhino related economic crimes	Good with political will, hopeless without!	Initiative lies with higher authorities than rhino managers	Smoother, quicker better prepared cases for court. Increase conviction rate. Increase risk vs reward equation.	Prosecutions
R	Risk vs reward. Equation in favour of criminals	Reverse the equation. Increase risk of arrest. Increase consequences of arrest. Mandatory custodial sentences. Conservative granting of bail only in exceptional circumstances. Speed up passage of court cases	Partially – if the corruptible opportunities can be resisted	Initiatives lie with higher authorities & politicians	Fewer criminals in jail for longer periods. Less rhino poached. Less resources spent on already arrested accused. More resources spent on prevention of poaching and working on new cases. Increased efficiency all round	Convictions Sentences
R	More K9 units in the airports and ports.	Implant K9 units in the international airports and find a way to deal with trafficking in the ports (high volume)	Partially	Lack of funds	Improved surveillance and detection of trafficking	Law Enforcement Financial
R	Lack of proactive attitude of the authorities in the consumer countries	Severe punishment of citizens of importing/consumer countries involved in trafficking	Partially	Lack of political will. Corruption	Less appetence for trafficking	Awareness Sentences Political Corruption
R	Lack of International Collaboration	Engaging country neighbours to collaborate as well as TRAFFIC.	Partially	Constrains are currently experienced with one country. Majority of horns leave the country into a country where authorities do no collaborate. Similarly difficulty is experienced with another country's authorities.	Syndicates operating out of Angola will be shut down	Collaboration
R	Difficulty in following the money once horns leave range State.	Collaboration with Angolan authorities, INTERPOL and TRAFFIC	Partially	On the ground poachers deal exclusively in cash. Once the products leave the country to Angola the currency is changed to US$ increasing the difficulty to follow the cash.		Networks Investigations Collaboration
R	High Economic value of horns	Abolish the market/trade in horns through signed protocols	Good	-Good leadership skills, -Passionate about conservation, -Hardworking and innovative, -Linkages with other local and international organizations	A health population of rhino in the country	Trade
R	Porous borders	Increase security along the broader line	Partially	-Border lines are porous making it difficult to curb the scourge	Reduced cross broader trafficking of rhino horn, Increase inter agency collaboration	Law Enforcement Collaboration
R	Inadequate Funding for anti-poaching	Allocate adequate funding	Good	-Prudent utilization of the scarce financial resources available	More money resonates into efficient and effective management thus; zero poaching and trade in rhino horn	Financing
R	Low numbers of IIU officers	Employ enough law enforcement staff	Good	-Prudent distribution of IIU staff	Increased IIU staff intel, increased presence and wide coverage. Thus, no room for trafficking	Staffing Law Enforcement

R	Lack of advanced equipment	Procure law enforcement equipment	Good	-Strategically allocation of equipment	Adequate and advanced equipment calls for timely detection and response to situations thus; enhances protection	Equipment
R	Lack of DNA profiling facilities	Establishment of DNA laboratories	Partially	Lack of funding	Successful convictions at courts, Detection on the origins of the horns.	Investigations
R	Lack of scanners at ports of exit and entry	Installation of modern scanners	Partially	Lack of funding	Improves detection of contraband and more seizures done	Detection
R	Lack of capacity to carry out controlled deliveries to final destinations	a. Need of legislation which legalizes controlled deliveries, Need of suitable resources to carry out the operations e.g. mobility, communication, detectors.	Partially	Lack of legislation and suitable resources	More syndicate members will be identified leading to disruption of criminal gangs up to sponsors.	Investigations Networks
R	Poor sharing of databases on wildlife syndicates and movement of criminals.	Improved sharing of information among members	Not	Lack of collaboration on concerned member states. And ICT technology	Improved databases and monitoring of syndicate members.	Cooperation Intelligence
R	Problems of mutual legal assistance with some countries that carries extra-territorial investigations	Ratify mutual legal assistance on exchange and repatriation of exhibits.	not	Legislation challenges allowing such operations.	Criminals will not have safe havens to hide. They will face criminal justice resulting in deterrent sentences given	Cooperation Investigations
S	"Disrupt" illegal rhino horn supply-chain and better control the supply systems.	Allow for a controlled horn trade	Partially -> good. While the system setup is easy, the effect may take more than three years	Most private rhino managers are already "ready" to commence on trade, and can begin almost immediately once a control system (e.g. Blockchain) has been set up.	Less poaching pressure on wild populations.	Networks Trade
S	Corruption	?	Not	It is an entrenched mind-set	It would be immeasurably more difficult for cartels to traffic wildlife products.	Integrity Political
S	Demand in Asia remains high	Allow for controlled trade. Sanctions.	Good.	Global politics		Trade Political Sanctions
S	Development of a trading "platform" like e.g. Blockchain to form the foundation of controlled horn trade	For on range State, allow the COI and an expert panel of computer scientists, law enforcement to develop a system	Good. There are 100s of similar trading platforms that can act as precedence and inspiration. There is no need to reinvent the wheel.	Emotions amongst mainly non-range State members of CITES prevents it from even being discussed and acknowledged as a "tool", despite 30yrs of decline under the current system. Lack of positivism and optimism, fear of making decisions	It would most likely reduce the pressure on wild rhino populations.	Trade
S	Ensuring benefit from conserving rhinos are felt in IPLC in range area.	Allow IPLC sustainable "user and management" rights according to the UNDRIP and SDGs	Not -> partially. IPLC are financially and knowledge disadvantaged and need support to acquire, manage and use rhinos sustainably	Currently, hardly any IPLC has the capacity to do this.	Potentially more private small-holders anchored in IPLC acting as deterrents/buffers to wild rhino populations	Communities Socio-economic
S	Ensuring benefit from conserving rhinos are felt in IPLC in range area.	Allow IPLC sustainable "user and management" rights according to the UNDRIP and SDGs	Not -> partially. IPLC are financially and knowledge disadvantaged and need support to acquire, manage and use rhinos sustainably	Currently, hardly any IPLC has the capacity to do this.	Potentially more private small-holders anchored in IPLC acting as deterrents/buffers to wild rhino populations	Communities Socio-economic
S	Ensuring that the value of live rhinos are higher than that of dead rhinos	Allow for a controlled horn trade	Good. The local authorities are their own decision makers. The CITES rules are clear for F2 generations, captive breed criteria etc.	It is ALSO a human right under the UNDRIP as well as a provision in the SDG, so there are no real legal obstacles preventing this from happening.	Most of the horns will be supplied by private breeders and the poaching pressure will decrease on wild stock. .	Socio-economic
S	Ensuring that the value of live rhinos are higher than that of dead rhinos	Allow for a controlled horn trade	Good. The local authorities are their own decision makers. The CITES rules are clear for F2 generations, captive breed criteria etc.	The case is simple; Captive bred species in the F2 generations are considered and can be traded, as long as they are appropriately record/registered.	Most of the horns will be supplied by private breeders and the poaching pressure will decrease on wild stock. .	Socio-economic
S	Follow-up on smuggling "mules" arrested with horn after flights from Africa via other flight hubs	Collaboration between law enforcement agencies in countries of horn origin and those where seizures are made	Good – if official/political will is developed	Inefficiency on the part of officials who fail on concerted efforts to trace horns back along every step of supply chain	More arrests of middlemen on the supply side	Cooperation Networks

S	Not directly involved in this aspect. Better articulated by staff in TRAFFIC. Suffice the say, at a local level, random VCP's in roads around a reserve/PA have seemingly been effective to constrain poacher movement	Open up trade to reduce illegal demand.	Unlikely given the stand from CITES	Trade regulations	Trade would provide the much-needed revenue streams required to protect rhino populations.	Trade
S	Persistent demand for rhino horn in consumer markets upholding the illegal market price, which in turn provides the incentive for trafficking to continue.	Direct engagement with consumers of rhino horn products to include them as part of a collaborative solution	Not unless a change of approach is agreed upon and adopted	This is largely beyond the reach of rhino managers and will depend on the initiatives of key governments (through their relevant agencies) and NGO players working together constructively (and agreeing to modify their current approach toward consumers, which tends to be more prescriptive)	Likely to have a positive effect on reducing illegal trade over time	Demand
S	Port authorities in many countries are not equipped to "discover" and confiscate shipments	Build capacity.	Not.	Global politics		Detection
S	Port authorities in many countries are not equipped to "discover" and confiscate shipments	Provide financial support	Good	Global politics		Detection
S	Private stockpiles in range State	Stringent auditing of stockpiles	Good – if official/political will is developed	Unwillingness of rhino producers to close loopholes that prevent laundering of horn onto black market	Reduced horn smuggling	Stockpiles
S	Processing of horns within Africa, for export as jewellery etc.	Very high penalties for processing horns in range States	Good – if official/political will is developed	Slow process of enacting legislation & lack of political will to do so	Reduced horn smuggling	Prosecutions Sentences Socio-economic
S	Prosecution and conviction of traders/traffickers INCLUDING foreign diplomats involved in it	Enforce the local national laws	Good. The laws are clear. There are lots of evidence. Politics only prevents it from taking place.	Political/financial pressure from demand countries are larger than support.	Disrupts and deter illegal poaching syndicates operations --- will result in less illegally poached rhinos	Convictions Prosecutions
S	Sensible policy toward rhino horn stockpile management, with full cooperation of all private stockpile holders	Create incentives for holders of private stockpiles to cooperate with other parties	This very much depends on the willingness and ability of government agencies to engage effectively (with positive support from NGOs)	As above, this is not in the hands of rhino managers directly, who can only do so much to secure stockpiles of harvested horn	Securing cooperation with holders of private stockpiles would enable more inclusive forging of a solution of the trafficking problem	Stockpiles
S	Weak surveillance of airports with regional or international flights	Install more scanning equipment and canine units	Good – if official/political will is developed	Lack of official/political will – in one range State, gold smuggling linked to senior officials/politicians means that surveillance measures are kept inadequate	More horn seizures	Detection
S	Working collaboratively to disrupt supply chain routes for rhino horn	Focused collaborative effort to pinch supply chains	Partially	Corruption and poor alignment of intelligence efforts regionally and internationally	If there was regionally and international alignment at disrupting the supply chains horn trade will have a massive impact in the supply side take off as the supply chain is most likely a few individuals so disrupting them can have a big impact on the ground	Cooperation Networks
S	Government corruption and complicity at both the individual and institutional level in source, transit and consumer countries stands as a major impediment to curbing illegal rhino horn trade.	Where evidence and credible intelligence suggests corruption, dogged investigation should become an unyielding imperative to piece together what actually transpired. International exposure and accountability is necessary to break the gridlock.	If left to their own devices, national authorities usually are incapable of effectively exposing and curbing corruption in their ranks even where honest individuals are in oversight positions. This is because it usually is very unclear how far the corruption extends and, more often than not, any heads above the parapet calling out malpractice	There is an entrenched reluctance to pursue corruption issues under the Convention. The default solution under CITES is to develop self-evaluation mechanisms as the key metric for assessing compliance issues. This essentially elevates self-interest and obfuscation as the primary values of decision-making. Corruption and complicity flourish in such an environment.	Success in exposing corruption AND holding guilty individuals accountable has been transformative in certain situations. Failure to do so usually allows corrupt practices to continue if not expand. This is a major issue where wildlife trade is concerned but always gets short shrift in terms of the kind of focused attention that really produces results.	Corruption Investigations

			usually get cut off, hence an ingrained reluctance to ever seriously rock the boat.			
S	Failure of governments to share seizure and stockpile data.	To make failure to report data a consequential non-compliance matter for offending nations who routinely shirk this CITES reporting obligation.	The ability to report data on seizures and stocks is wholly within the capabilities of every CITES Management Authority even in instances where other governmental bodies hold the primary data.	It is of concern that some countries believe that reporting such data implicates them in illegal wildlife trade so there is strategic reluctance to volunteer information.	The ability to monitor the trade would be greatly enhanced if key datasets were more robust. All systems are only as good as the data they receive. Failure to have a good dataset for analytical purposes leads to faulty conclusions that may not be supportive of good rhino conservation.	Stockpiles
R	Syndicate / Network Dynamics	Law Enforcement agencies to be just as fluid and dynamic with regards to information sharing, not restricted to provincial boundaries and ensuring associated information sharing	Partial	Syndicates always changing and adapting modus operandi – managers and law enforcement need to adapt accordingly	Minimised poaching incidents, increased arrest and prosecution of high value targets	Networks Law Enforcement Cooperation
R	International cooperation between countries of origin of rhino products and consuming countries	Contact person and details in each country to contact when seizures are made or when intelligence need to share	Good	Little or no cooperation from countries where seizures are made	Much quicker turnaround time for DNA analysis and outcomes of possible court cases. Sharing of intelligence to arrest traffickers	Cooperation Intelligence Seizures Law Enforcement
R	Inadequate funding	To get donors and other stakeholders to extend their support for fighting rhino horn trade. To adequately involve private sector, communities and public in the fight against rhino horn trade	Partially	Overreliance on Government budget and traditional donors especially WWF and FZS	Enhanced rhino seizures resulting from improved law enforcement. Sustainable funding that will improve capacity of law enforcement staff to pursue trafficking network and syndicates	Financial Communities Private
R	Inadequate equipment	Get private sector involved to support acquisition of major working equipment. Continue to persuade government to increase budget for protection of rhino populations	Partially	Low awareness of the private sector on rhino conservation	Motivated human capital (law enforcement staff) and improved efficiency in terms of rhino horn confiscations	Equipment
R	Inadequate cross border collaboration	To revive the EAC RMG and adequately involve CEOs of the wildlife authorities of the member countries. Effectively involve top Government officers from the security organs (Police, TISS, TPDF, Immigration Department) in the cross border initiatives between two range States	Good	Rhino managers not involved in cross border meetings	Improved and sustained law enforcement efforts to combatting illegal rhino horn trade	Cooperation
R	Inadequate capacity to determine genuine rhino horns	Short course to rhino and other law enforcement staff	Good	Lack of fund to conduct short courses for rhino and other law enforcement staff	Improved confiscations of genuine rhino horns in range State	Training Seizures

Appendix 6. Examples of initiatives aimed at curbing trafficking provided by range State representatives and other respondents. We identify an example as one provided by a range State representative (R) or a specialist (S). We also indicate the elements that an example contains that were used to tally frequencies in Fig. 3.

R/S	Practice	Objectives	Achievement	Success factors	Failure risks	Improvements	Elements
R	Target detection of rhino horn trafficking in the country.	Use of sniffer dogs to detect rhino horn.	Yes: Success in detection of trafficked rhino horn.	Apprehension with good evidence for prosecution.	Not so impactful in detecting the major horn outflow from the country as illegal border crossing appeared to be the major source.	Engagement with neighbour countries law enforcement for detection of illegal border crossing and apprehension	Detection Technology
R	Public offer of rewards for verified information which lends to prevention of rhino poaching/arrest of rhino poachers	Intercept trafficking. Create mistrust among syndicate members	partially	Debriefings suggest mistrust was achieved. Most info acted on resulted in arrests, but false horns were normally intercepted		Increase reward offered	Intelligence Networks
R	Recruit informer base	Increase credible intelligence on poaching/trafficking groups	partially	Dependable payments of reward. Good communication with local informants. Confidentiality guaranteed. Respect handler/informer relationship	Info of groups operating from long distance e.g.: two range States, was scarce unless ground work prepared by groups locally.	Better info sharing and gathering from neighbouring countries, source, transit and destination countries	Intelligence
R	Run counter intelligence among workforce to ensure corruption attempts are exposed AND acted upon.	Root out the enemy within – the most dangerous of all. Offer alternative legal income through access to rewards from exposing trafficking and poaching. Encourage disclosure of approaches by syndicates among staff (carrot & stick approach)	yes	Act on info. Confidentiality guaranteed. Attractive payments for info even if not as lucrative as becoming involved in poaching		Increase rewards offered.	Integrity
R	Engagement of and working with related stakeholders at airport and ports where a key sites transporting the horns.	To develop understanding, awareness and commitment in combatting horn trafficking.	Integrated tasks and actions in combatting horn trafficking at the sites; Implementing strict detection to horn trafficking in and out of the country. Solid cooperation and communication among related partners.	For success: Strick supervision to horn trafficking at the sites, communication on any handling of illegal trafficking investigated and prosecuted, continuing campaign on combatting horn trafficking, openness to public on all horn traffickers who is sentenced and fine, feedback from public on efforts of the integrated task force and continue to refine the efforts.	Tasks can worked are campaigns, communication, collaborative actions, law enforcement,	Setting a real time in detecting anything of parts of wild animals especially on horn trafficked at the sites. Monitoring to all persons at the sites (airport and ports) and passengers at the entrance and applying strict detection to things carried and transported. To any suspicious things (which are related to parts of rhino horns), any person or passenger must be interrogated, investigated and prosecuted for law enforcement.	Detection Prosecution Awareness Investigation
R	Establishment of K9 unit at International airport	Detect rhino horn in the luggage of international passenger	Yes partially	Occultation Methods improved by traffickers not enough dogs to cover cargo area and other international airports in the country	Obstruction of other authorities in the airport in the beginning but solved. The K9 unit have free access to all areas except tower.	Have at least more 4 dogs to cover the cargo area of the airport.	Law Enforcement
R	Sensitization and Training of prosecutors and judges	The sensitize and familiarize the prosecutors and judges with wildlife crime and the specific law	Yes, Partially	It is continuous work because of mobility of prosecutors and judges and new magistrates coming into the system.	It made a significant change in court cases	Create more training opportunities for the investigation police on crime scene and forensics in general.	Prosecutions Convictions

R	Establishment of rhino task team (RTT)	RTT is a formal cooperation between the Protected Resources Division of national police within the Ministry of Home Affairs, Immigration, Safety and Security and the Intelligence and Investigation Unit within the Ministry of Environment, Forestry and Tourism. RTT works within a framework to eradicate commercial poaching and trafficking of illegal game products.	Yes	Since the inception of RTT over 100 pre-emptive arrests have been made in some 30 cases of conspiracy to poach. A number of high-level kingpins have been arrested over the last 6 months, including international kingpins. Since the inception of RTT about 700 suspects were arrested in cases relating to high-value species. They have also developed a comprehensive Wildlife Crime Database for the range State.	Collaboration of multiple Government agencies have been the success. Operatives have been targeted by criminal syndicates and court cases made against them.	Budget is required to defend operatives against court cases brought against them by criminal syndicates.	Investigations Arrests Networks
R	Dehorning	This was an initiative meant to combat horn trafficking by cutting the rhino horn	Yes	No poaching was done during this period hence resulting with no horn trafficking.	Dehorning worked	Use of drones for monitoring and surveillance to combat horn trafficking.	Dehorning Technology
R	Implants	For monitoring purposes especially the movements of the species.	Yes	Because animals were easily tracked, monitored and located without challenges.	Implants worked	Fencing part of the park for rhinos only coupled with provision of CCTV cameras for surveillance purposes.	Surveillance Technology
R	24/7 Surveillance and monitoring	For monitoring purposes as one way of combating horn trafficking	Yes and the initiative is still in use	Because it is a 24/7 monitoring and surveillance as such no any threat to rhino poaching for horn	The initiative is still working	Increase the fuel allocation for patrols along the park fence boundary and also use of airspace during the day.	Surveillance
R	Informer Network	To curb trading in rhino horn	Yes	Timely reception of intel, Number of suspects apprehended	In minor circumstances, unreliable informants, Informer network worked very well	All law security wings to be fully involved in wildlife crime prevention	Intelligence
R	Rapid Deployment Team/Canine Unit	To respond to emergency encounters	Yes	Increased Number of suspects, Backstopping	The initiative worked well, Quick intervention	The Rapid Deployment Teams to be located at area level unlike centralised at Regional level	Dogs
R	Surveillance	To know the syndicates and linkages involved	Yes	Some syndicates known and still under investigations	Possible trade routes identified, Syndicates known	Prioritise joint cross broader operations, Need for more advanced equipment to detect horns, Strengthened inter agency collaboration	Surveillance Networks Investigations
R	Deployment of Compliance Officers at exit and entry points	- To detect concealed contraband and proceeds. To detect permit fraud	Yes	A seizure of ground rhino horns were done successfully in 2018. 20.86kgs	Law enforcement officers arrested seven (7) member syndicate from one country	Improve communication with consumer nation and improve information sharing via INTERPOL	Detection
R	FITTING of transponders in a horn	Monitoring movements of Rhinos through horn implants.	Yes	A successful arrest was done when an aircraft was used to follow 68-75km horn from poaching scene to town	After recoveries the suspect was arrested	Provision of modern horn implant and microchips	Networks Technology
R	Intelligence -led stop and searches on routes along or exiting habitats	To detect concealed contrabands	Yes	Successful follow-ups and shoot-outs occurred leading to the arrest and deaths of known poachers	Suspects were arrested	Improve on mobility and equipment	Intelligence Networks
S	Dehorning in conservancies	Reduce reward for poachers while maintaining risk for them to harvest horn stubs	Partially	Where anti-poaching effort was weak (insufficient manpower or organization) poachers would still harvest horns for low return, since risk was also low	Removing hundreds of kg of horn that would otherwise have entered black market.	More stringent, CITES supervised auditing of horn stockpiles to avoid leakages	Dehorning
S	EAZA engaging with the non-range States for policy formulation and guidance with regards to CITES, CBD etc.	To influence non-range States' policies to reflect the real needs of conservation on the ground, as well as find workable solutions.	Too early to say				Legislative
S	Intelligence	To improve our response in case of rhino poaching	Partially	We haven't had the opportunity to test it BUT some suspects have been apprehended in possession of rhino horns in on range State			Intelligence

S	Intelligence, science-based evidence and effective law enforcement	To break the supply chain and prevent future trafficking by finding out about and keeping up to date information on the trade routes of the country/range State and the routes through entry port locations and to consumer countries and where/for what the horn is used and by who, trends and prices to help understand demand to combat the illegal trade in rhino products from all five species by improving law enforcement where most needed.	In one range State we have a lull in poaching/trafficking having learned from past mistakes, but trafficking can still occur through the country, combined with other illegal products e.g. ivory, due to corruption and cartels at the border crossings and entry/exit points. In consumer countries the biggest market today is one named State and the cross border trade from specific region needs to be curtailed with international support against corrupt criminals involved, an objective still largely unmet.	Poachers/traders use mobiles to communicate and take advantage of full moon nights and holidays to get rhino horn and out of sanctuaries and knowing such facts enables us and enforcement teams to work together to prevent poaching/trafficking. More border point checks are needed with dogs and greater transparency to hinder criminals and key is commitment from the top officials employing the best enforcement officers with cross border intelligence and judiciary for these cases with magistrates who act quickly and who are not bribed so that kingpins are sentenced appropriately with asset forfeiture (to reward informants and help conserve rhinos).	Private/community sanctuaries working with Parks and Reserves with the support of the government at the highest levels, detection dogs at airports, a non-corrupt judiciary is needed if high penalties are to be a deterrent, especially against the traffickers. Monitoring the consumer markets – both physical and online – to curtail illegal sales and focussing on traders threatening rhinos in Africa and Asia (with well-meaning western governments not being distracted by bans on authentic antiques that can be a red herring detracting funds and effort from the serious issues of protecting rhinos where most needed and where funds and support must be directed first and foremost with clear messaging to that effect).	More kingpins sentenced effectively. When traders are caught with horns find out from them about the supply chain, prices paid for horn per kg, rather than just confiscating them with no data collected to help break the supply chain. More support and coordination from those countries with their nationals involved in trade is needed. Diplomatic bags to be checked by dogs. Work with the consumers who are the main users of rhino horn, not forgetting rich elite etc. One State has an ancient relationship with rhino products to understand without Western patronizing jargon that may backfire. We need full cooperation in wrong doing prevention/detection.	Intelligence. Networks
S	Forensic sampling & DNA profiling	Add to regional reference collection for tracing horns seized on black market	Partially	Excessive restrictions on export of samples from one range State	Limited export before restrictions became prohibitive	CITES-endorsed simplification of export measures (dealing also with restrictions arising from Convention on Biological Diversity regarding DNA exports)	Networks
S	Secure rhino horn stocks and ensure the management process thereof is safe, thorough and secure.	To manage rhino horn from the field (natural death/seizures) to a headquarters offsite for storage and safekeeping.	Yes – at a local level	N/A	A well-documented Standard Operating Procedure (SOP) for the management and control of rhino horn was effective, including microchipping/DNA collection in terms of requirements of the Regulations.	Nil	Stockpiles
S	Wild crime Prevention in range State	Intelligence driven approach to pre-emptively catch poachers and apprehend criminals that have committed a rhino crime	Partially	Difficult to have absolute oversite in such a large landlocked country with so many different borders and massive cross border trucking system.	Good intelligence network, good team and expanding aspects regionally with information network working well together	Funding remains a challenge and needs long-term funding going forward	Intelligence
S	Zoos worldwide are raising awareness through various means regarding the subject combatting rhino poaching.	Engage visitors to participate / fundraise for rhino conservation projects	Partially	It is difficult to see what visitors do once they leave the zoo… but we found that a lot of funding comes in when zoos proactively encourage visitors to participate.	Good communication is key that shows where money goes to. Credibility of information are essential as this leads to credible communication (visitors.. press… fundraising)	Often zoos have various focuses (different species / topics) therefore rhino poaching is not a sole focus and will not be talked about all the time… Good campaigns (like the EAZA Rhino Campaign in 2005 / 2006) have shown that the effort to focus for 1 – 2 years on a topic may reach much more people	Funding
S	Zoos worldwide are raising awareness through various means regarding the subject combatting rhino poaching.	Engage zoo to participate in rhino conservation projects	Yes	The EAZA Rhino TAG has good opportunities to inform zoos of what projects are currently doing very well on the ground and are 'worth supporting' The EAZA Rhino TAG has the opportunity to invite guess speakers from the field or the IUCN SSG to	The active engagement NGOs (like SRI and IRF) have been very useful in providing information to zoos and to facilitate partnerships between zoos and field projects. It is very important to have a	Personally I very much encourage good cooperation between zoos / NGOs / IUCN and field partners. The better this works, the larger our credibility in helping to combat rhino poaching	Funding

				participate in meetings and to present projects	trustworthy NGO at place, good partners and the approval / cooperation from the IUCN SSG.		
S	Zoos worldwide are raising awareness through various means regarding the subject combatting rhino poaching.	Inform visitors by 1) Panels next to exhibits, 2) Keeper talks, 3) Exhibits next to enclosure, 4) Press releases, 5) Social media	In how far this is actually having an impact is difficult to assess but the issue of raising awareness is working in the sense that people are aware of the issue.	It is difficult to assess the educational value of panels. But it seems that the direct contact (keeper talks, meet the rhinos, info mobile …) have a great impact to explain the subject to visitors. We also noticed a high interest by the press and the subject in often present.	Zoos have the opportunity to work with life animals and thereby can generate emotions. Having good staff adds more information and all interactive 'experiences' leave an impact	The subject is so dire that a lot of people 'loose' the trust and energy however it may be possible to combat rhino poaching	Awareness
S	Zoos worldwide are raising awareness through various means regarding the subject combatting rhino poaching.					What is essential here are good information that are passed on to all partners so that they can use them in their education / media department	Awareness
S	Collecting data on rhino horn seizures, i.e. quantities of raw rhino horns or rhino horn products seized, trade routes used, nationalities of offenders, methods of transport and concealment, etc.	To acquire sufficient data to assess comparatively the status of rhino horn trafficking on an annually basis. That serves in identifying key sources of horn and countries of export, transit and consumption for CITES attention.	Ad hoc efforts at data collection have occurred and comprehensive IUCN/TRAFFIC reports that describe developments over time, including identification of those countries most heavily implicated in illegal trade, have been submitted to each CITES CoP.	The reports have served a useful purpose in terms of highlighting the landscape of illegal trafficking and consumption, but the follow-on response of the CITES Parties and the Secretariat have been for the most part ineffective in pressuring serious offenders to address salient issues with effective and accountable actions..	Data collection on seizures is inhibited by the lack of reporting by key countries along the trade chain. Obfuscation and failure to disclosure seizure data is a growing concern.	Failure to disclose rhino horn seizure data needs to become a serious oversight imperative of the CITES Standing Committee and the use of punitive actions, such as the suspension of all CITES trade, needs to become a sanctioned tool of the Convention.	Trade Networks Demand
S	Collection of data on the status of rhino horn stockpiles on an annual basis to track accumulation and other issues	Some data on rhino horn stocks has been forthcoming from certain Parties but overall it is far from comprehensive and complete.	Some degree of assessment has been possible but higher level analysis has been lacking,	Most countries lack effective systems of stockpile management. Predictably, the lack of accountability for stockpile management gives rise to stock thefts and unexplained losses over time. Horn in government custody that leaks into illegal trade remains a critical secondary supply of rhino horns on international markets.	CITES decisions have called upon all countries to report stockpiles and to invest in stockpile management, but so far there are no meaningful consequences for failure to do so.	As above, failure to secure and report rhino horn stockpiles should be elevated to a serious issues and punitive measures against chronic offenders need to be a regular feature of the Convention where warranted.	Stockpiles
R	Training of detection dogs from the park's K9 unit on rhino horn specifically.	To grow capacity for K9 use in the park and to deploy dogs in reaction and active detection scenarios to support law enforcement and other security organs in the country as needed.	Partially- training is still underway but dogs have become proficient in detection of rhino horn.	Training is still underway. Training has been successful to date and dogs are competent in detecting rhino horn.	Training has followed the widely-accepted methods for exposing dogs to new items for detection and growing their capacity as the training has progressed. Some dogs have greatly outperformed others and these individuals will be the focus of advanced training.		Detection Dogs
R	Legislation to regulate legal rhino horn trade range State. Legislation to regulate illegal trade if TOPS is not adhered to – e.g. If you have no TOPS permits to possess/trade						Legislative Trade

	in/sell/receive/dehorn etc. criminal action can be taken					
R	A DNA analysis initiative – (taking of DNA samples from horns as per The norms and standards for the marking of rhinoceros and rhinoceros horn and for the hunting of rhinoceros for trophy hunting purposes.	To try and track horns from origin – if stolen for example DNA can be used to trace who was the legal owner of the horn, To link horns that was seized with either a carcass or a dehorned animal	Yes – we have been able to establish in more than one case where the horns originated from. Links made	The keeping of the national database of all horns that have been sampled was not keep updated but we are in the process of doing the updating	Not all samples have been analysed yet but we are working with the VGL to deal with the backlog.	Law Enforcement Investigations Hunting Prosecutions
R	Publishing norms and standards for the marking of rhinoceros and rhinoceros horn and for the hunting of rhinoceros for trophy hunting purposes.	To ensure that issues that was not addressed in NEMBA be dealt with in Norms and Standards	Partially – we still have non-compliance with the norms and standards		Some of the actions in the norms and standards such as reporting of stolen horns within a certain period did not work as provinces did not include this as a permit condition on rhino horn possession permits	It would be better to have the issues included in the national legislation	Legislative Stockpiles Hunting
R	National Fusion Centre, National Analysis Unit, National Environmental Crime Database	Centralised repository of environmental crime information (both incidents and arrests)	Fusion Centre Established, Analysis Unit Established, Database Established, Historical information migrated and consolidated, Current information routinely captured and analysed however would consider partially achieved.		Centralised system works well: Feedback and support to IO's – case / court. Analysis on pressure, threat modus operandii. Focused Investigations – high value targets	Continue enhancing skills and internal capacity. Improved support to law enforcement teams	Cooperation Investigations Intelligence Arrests Law Enforcement
R	Keep the horns from the dehorned rhinos in a safe place.	Avoid the disappearance / theft of rhino horns	Yes				Stockpiles
R	Recurrent checks and official books kept on the items at risk of trafficking (ag. Ivory or rhino horns)	Prevent the input on the market of items that were collected in the field (e.g. Natural deaths) or confiscated	Yes				Stockpiles
R	Intelligence support	To confiscate rhino horns and elephant tasks	No	Could be that the illegal horns are not available as we have not lost rhino to poaching for the last 4years and that our population is not that much big	Our national task force worked very well only that the illegal horns were not available, they ended up confiscating fake horns but there were a lot of confiscation of elephants tasks		Intelligence Seizures