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**Ancrenaz, M, Barton, C, Riger, P and Wich, SA**

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**Building relationships: how zoos and other partners can contribute to the conservation of wild orangutans**

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5 Building relationships: how zoos and other partners can contribute to the  
6 conservation of wild orangutans  
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10 (2) AUTHORS:  
11

- 12 (1) Marc Ancrenaz, HUTAN-KOCP, PO box 17793, 88874 Kota Kinabalu, Sabah,  
13 Malaysia. Email: marc.ancrenaz@yahoo.com  
14 (2) Catherine Barton, Chester Zoo , Cedar House, Caughall Road, Upton by  
15 Chester, Chester CH2 1LH, UK  
16 (3) Peter Riger Houston Zoo, 1513 Cambridge, Houston, TX 77030 USA  
17 [priger@houstonzoo.org](mailto:priger@houstonzoo.org)  
18  
19 (4) Serge Wich, School of Natural Sciences and Psychology, Liverpool John  
20 Moores University, Byrom street, L33AF, Liverpool, UK and Institute for  
21 Biodiversity and Ecosystem Dynamics, University of Amsterdam, Science Park  
22 904, 1098XH, Amsterdam  
23  
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27 (3) ABSTRACT:  
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29 With both species of orangutan now listed as critically endangered, orangutan  
30 conservation needs some critical rethinking. Habitat loss, degradation and  
31 fragmentation, and hunting are continuing to push their populations towards further  
32 decline. Conservation efforts focusing on rehabilitation and habitat protection are in  
33 place but are insufficient unless we move towards a landscape approach that will  
34 aim at protecting and connecting areas rather than isolated patches of forest.  
35 Conservationists need to engage with communities and industry to really protect the  
36 species at a landscape level. This paper explores the current efforts in orangutan  
37 conservation on the ground and from the zoo community and new areas emerging  
38 to contribute to these new approaches needed to positively impact orangutan  
39 populations on the ground.  
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43 (4) KEY-WORDS:  
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45 Pongo, conservation, ex-situ, in-situ, oil palm, sustainable, landscape approach,  
46 behavior change  
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3 (5) TEXT:  
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5 MAJOR THREATS TO THE SPECIES  
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8 The two orangutan species, *Pongo pygmaeus* in Borneo and *Pongo abelii* in Sumatra,  
9 are now critically endangered because of the loss and fragmentation of their habitat,  
10 and hunting (Ancrenaz, Gumal *et al.*, 2016; Singleton *et al.*, 2016).  
11

12 **Habitat destruction and degradation**  
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14  
15 Satellite data show that in Sumatra, 60% of key orangutan habitat was destroyed  
16 between 1985 and 2007 (Wich *et al.*, 2008), while 40% was destroyed in Borneo  
17 between 1973 and 2010 (Gaveau *et al.*, 2014). On these islands, tropical forests are  
18 primarily converted to large-scale industrial plantations (oil palm, rubber, acacia and  
19 other tree species), small-scale agriculture, mining concessions, dams and other  
20 types of land-uses.  
21

22  
23 Orangutans on Borneo, more so than in Sumatra, show behavioral flexibility that  
24 allows them to, at least for the short term, survive in areas that have been affected  
25 by logging, have been fragmented, or are converted to acacia and oil palm  
26 plantations (Ancrenaz *et al.*, 2010; Meijaard *et al.* 2010; Campbell-Smith *et al.*, 2011;  
27 Ancrenaz *et al.*, 2015; Spehar & Rayadin, 2017). However, extractive activities and  
28 other types of human disturbances might displace animals temporarily, and result in  
29 the influx of newcomers in nearby home ranges (which is called “compaction” effect)  
30 with unknown long-term social impacts on the resident populations.  
31  
32

33 **Habitat fragmentation**  
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35  
36 Habitat fragmentation is an ever-increasing threat given the current land conversion  
37 occurring in Borneo and Sumatra. New roads, bridges, dams or railways split  
38 populations in smaller subpopulations and give access to poachers, settlers and  
39 other human encroachers, putting new pressures on remote populations. In these  
40 newly created man-made landscapes, orangutans often seek refuge in whatever  
41 forest patches are left. Although orangutans are mainly arboreal they can walk  
42 several kilometers on the ground (Ancrenaz *et al.*, 2014), which could facilitate their  
43 movements between forest fragments. Fragmentation leads to smaller populations  
44 that are more susceptible to stochastic and non-stochastic threats and show reduced  
45 long-term survival (Marshall *et al.*, 2009). In addition, more fragmentation results in  
46 a higher proportion of the orangutan habitat being bordered by non-forest, which  
47 carries new survival risks, such as potentially dangerous encounters with people or  
48 dogs, infrastructures (electrical lines, etc.), exposure to diseases from humans and  
49 domestic animals. The latter particularly needs specific attention due to its almost  
50 total lack of knowledge about risk management.  
51  
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55 Ultimately, poor land-use practices that do not consider biodiversity and ecosystem  
56 services, and lack of collaboration and communication between the different groups  
57 of land-users are responsible for the increased degradation and loss of tropical  
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3 natural habitats.

#### 4 5 **Illegal killing**

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8 On both islands, people have hunted orangutans for a long time, and today,  
9 orangutans are still killed to mitigate conflicts or for meat consumption (Davis *et al.*,  
10 2013; Wich *et al.*, 2012). Across Borneo, interview surveys revealed that between  
11 2,000 and 3,000 individuals were killed annually in average (Meijaard, Buchori *et al.*,  
12 2011). In many areas, the overall mortality rate due to killing exceeds the natural  
13 breeding rate, driving most populations to extinction (Marshall *et al.*, 2009).  
14

15  
16 Poor knowledge about the protected status of orangutan, weak enforcement of  
17 existing laws, and absence of prosecution of people responsible for orangutan illegal  
18 trade or poaching are major obstacles to improve the situation on the ground  
19 (Meijaard, Wich *et al.*, 2011).  
20

#### 21 22 **CURRENT CONSERVATION EFFORTS**

23  
24 Despite decades of efforts and a significant amount of financial and human  
25 resources dedicated to orangutan conservation, both orangutan species are critically  
26 endangered, and their number continues to decline; showing that overall,  
27 conservation has failed the species (Meijaard, Wich *et al.*, 2011). Two major  
28 strategies are used to conserve orangutan: rehabilitation/reintroduction and habitat  
29 protection (Wilson *et al.*, 2014).  
30

#### 31 32 **Orangutan rehabilitation and translocation**

33  
34 Today, the media often present orangutan rehabilitation and reintroduction as the  
35 frontline of orangutan conservation efforts. However, the emotive nature of ape  
36 reintroduction can be counterproductive for in-situ long-term conservation of wild  
37 populations and their habitat. Rehabilitation targets one area facing orangutan  
38 conservation, and it often becomes an animal welfare discussion, which indirectly  
39 competes for resources and prioritization with other strategies to protect habitat on  
40 a landscape scale (Wilson *et al.*, 2014).  
41

42  
43 The rehabilitation success rate is low, probably far below 50% (Russon, 2009), unless  
44 a very intensive and costly post release monitoring is undertaken (Robins *et al.*,  
45 2013). Between 1964 and 2008, the various reintroduction centres located in  
46 Indonesia and Malaysia rescued at least 3,320 individuals and released about 1,250  
47 animals (Russon, 2009). However, during the same time, tens of thousands of wild  
48 orangutans were lost because of forest destruction and poaching (Ancorenaz *et al.*,  
49 2016).  
50

51  
52 Translocation is often perceived as the silver bullet to “rescue” stranded orangutans  
53 that are surviving in forest patches, and to move them somewhere else. However  
54 this type of rescue operation can have perverse consequences, such as the  
55 destruction of the forest patches after orangutan translocation. In addition, the land-  
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3 users are not encouraged to develop better land-use practices within their own  
4 concession to manage the protected species they are accountable for if the animals  
5 are removed.  
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8 The strategy in itself is a reactive approach to a crisis and should be incorporated  
9 into a proactive discussion on reducing and repairing habitat loss to reduce the  
10 injured wildlife/orphan problem. A recent financial cost/benefit analysis showed that  
11 orangutan conservation should primarily focus on habitat conservation and  
12 management, and not rehabilitation (Wilson *et al.*, 2014).  
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### 14 **Habitat protection**

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16  
17 Undoubtedly, identifying and protecting key orangutan populations and their habitat  
18 should remain the cornerstone approach to ensure the long-term survival of the  
19 species.  
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21  
22 Over the past 15 years, Sabah (Malaysian Borneo) has significantly enlarged the  
23 network of strictly protected forests from 12% to about 27% of the total landmass of  
24 the State, encompassing more than 70% of its current orangutan distribution.  
25 Orangutans in Sarawak face a similar situation, where the majority of the remaining  
26 animals are all located within fully protected forests. However in Indonesia, only  
27 about 25% of the wild orangutan distribution occurs in protected forests, and many  
28 of these protected forests are still degraded by illegal activities (Wich *et al.*, 2012). In  
29 Sumatra, most orangutans are concentrated in the Leuser Ecosystem where  
30 protected and unprotected forests are still encroached and converted to other types  
31 of land-uses at an alarming rate (Singleton *et al.*, 2016).  
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### 34 **MOVING FORWARD**

#### 35 **We need to rethink orangutan conservation at the landscape level**

36  
37 Under the current situation, it appears that the long-term survival of most orangutan  
38 populations will rely heavily on (1) improved management of non-protected forests,  
39 and (2) minimizing losses among orangutan populations living in these areas. This  
40 means that conservation strategies need to focus on both protected and non-  
41 protected areas, and this will require a shift of the overall conservation mindset and  
42 novel approaches to conservation. The immediate need for such a shift is  
43 highlighted by the presence of approximately 10,000 orangutans within  
44 undeveloped plantations that had been earmarked for oil palm conversion in Borneo  
45 alone (Meijaard, Morgans *et al.*, 2017).  
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#### 51 **Better land-use decisions**

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53 Land-use deciders and planners need to take into account not only the socio-  
54 economic dimension of their choices but also the long-term ecological impacts.  
55 Indeed, deforestation comes with a real cost in terms of destruction or degradation  
56 of ecosystem services and foregone benefits that political or industry leaders never  
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3 considered in their decisions (Meijaard, Ancrenaz *et al.*, 2017). Not considering  
4 externality costs is risky business. Locally, communities will be impacted in their daily  
5 lives and will have to pay the cost of these choices in terms of erosion, pollution,  
6 flooding, health or loss of access to natural assets.  
7

8  
9 Ecological connectivity is a key element of sustainable development in Borneo and  
10 Sumatra, requiring land-use decisions to be undertaken at multi-scale levels and not  
11 limited by the political and administrative boundaries of a company or a district or  
12 even country (Runting *et al.*, 2015). A possible frame to achieve a land-use planning  
13 over a larger landscape is given by the “jurisdictional approach” that aims at  
14 certifying a given production at the scale of a state, such as the one decided by  
15 Sabah, the Central Kalimantan Province and the South Sumatra Province to certify  
16 their entire oil palm production by 2025.  
17

### 18 19 **Policy changes**

20  
21 The current orangutan protection status is inadequate in curbing population loss in  
22 the two range countries and the political framework can also hamper orangutan  
23 conservation (Cotula *et al.*, 2015). For example, it is urgent for the two range  
24 countries to revise laws and policies that are preventing landowners from retaining  
25 areas in their concessions under natural forest cover, or HCVF.  
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### 28 29 **Empowering local communities**

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31 In non-protected habitats, forest reduction results in a closer proximity between  
32 people and animals, which inevitably lead to conflict situations. Orangutans can  
33 consume entire fruit crops in orchards belonging to local villagers resulting in  
34 significant economic losses (Campbell-Smith *et al.*, 2011). Agro-industrial plantations  
35 also experience economic losses when apes kill acacias by stripping bark and  
36 cambium (Meijaard *et al.*, 2010), or pull out stems of young palms to feed on their  
37 heart (Ancrenaz *et al.*, 2015). These conflicts result in orangutan killings and create a  
38 negative perception towards wildlife, which has been a major impediment to  
39 building local support for conservation. In these newly created landscapes, it is  
40 urgent to identify and implement peaceful ways to mitigate possible conflicts with  
41 species like orangutans including: regular patrolling; new landscape design; drains  
42 and rope bridges; tree protection devices, awareness; insurance schemes; etc.  
43 (Campbell-Smith *et al.*, 2012). We also need to encourage these groups to become  
44 active participants in conservation and not simply beneficiaries of what it can offer.  
45 Communities need to be better empowered to act.  
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### 49 50 **Engaging with the Industry**

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52 Although still hotly debated today by many, we need to acknowledge that well-  
53 managed plantations can provide foraging resources and dispersal opportunities for  
54 orangutans and other species. They can also preserve important ecosystem  
55 functions.  
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3 Considering that more than half of the range of the Bornean orangutan is found  
4 within forestry or agriculture concessions (Wich *et al.*, 2012), we need to ensure  
5 better biodiversity conservation outcomes in man-made landscapes. This requires  
6 for industry players to embrace better management practices that minimize the  
7 strong negative impacts of forest exploitation and agro-industrial development  
8 (Ancrenaz, Meijaard *et al.*, 2016).  
9

10  
11 Retaining forests within an agro-industrial landscape is key in preserving ecosystem  
12 functionality, improving meta-populations and facilitating dispersal and survival of  
13 many species such as the orangutan. Remaining forests that sustain key orangutan  
14 populations should be identified as 'High Conservation Value Forests' and  
15 maintained as such. Engaging with the land-users before they start their on-the-  
16 ground operations, influencing ways they are going to develop their plantations or  
17 adapting current policies to the conservation needs of orangutans appear to be the  
18 only way to minimize the losses of orangutan lives.  
19

20  
21 Best management practice guidelines are already available under several  
22 certification schemes: RSPO for the oil palm growers or FSC for the timber industry  
23 (among others). Although these guidelines must be further improved, they are a  
24 start towards more sustainable practices. Simultaneously, we have to recognize that  
25 the industry needs significant incentives to develop and to implement these best  
26 management practices: educating consumers towards sustainable choices  
27 guaranteed by certification is one way to influence on-the ground practices  
28 (Ancrenaz *et al.*, 2016).  
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## 32 ZOOS AND ORANGUTAN CONSERVATION

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34  
35 Traditionally, the zoo community has mostly been a financial source of support for  
36 in-situ conservation initiatives. In 2012, the World Zoo and Aquarium community  
37 reported that they spent nearly US\$ 350 million on wildlife conservation, making this  
38 community one of the major financial supporters of conservation efforts globally  
39 (Gusset & Dick, 2011). Zoo's financial support to in-situ conservation projects on the  
40 long-term (ie over several years) is key to create success stories. But zoos have much  
41 more conservation skills to offer than financial support, in terms of species  
42 management and conservation breeding, capacity building, technical expertise and  
43 advocacy and outreach activities amongst more than 700 million visitors every year  
44 and with industry.  
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### 47 **Capacity building**

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50 Zoos are increasingly working with staff from in-situ programmes for training and  
51 exposure sessions. The Orangutan Veterinary Advisory Group, initiated through  
52 Orangutan Conservancy and supported by Chester Zoo, brings together expertise  
53 from in-situ field projects, zoos, industry, academia, NGOs and Government to  
54 provide a sustainable cadre of professionals providing capacity building on wildlife  
55 health matters in Indonesia and Malaysia.  
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3 Community engagement is a vital part of the work of zoos and transferring this  
4 knowledge to field projects is a key role that can reinforce orangutan conservation.  
5 In Sabah, Chester Zoo supported and supervised the development of the “Hutan  
6 Education Awareness Program” Master Plan with the HUTAN team, following  
7 principles of strategy development from educational professionals in the UK. This  
8 collaboration allowed a transfer of skills between the zoo and field project to  
9 produce a solid education strategy with follow up evaluation built into the  
10 programme.  
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14 Another venue pursued by Houston Zoo and other zoos is to create scholarships to  
15 support students from range countries who will become the face of conservation of  
16 the species they are interested in. These scholarships are covering fees to obtain  
17 high-level education degrees in national and international universities (MSc and  
18 PhD), funds to attend professional conferences and meetings, such as the IUCN  
19 Species Survival Groups, or are used to facilitate lateral staff exchange between in-  
20 situ conservation projects to reinforce the skills and network of local field research  
21 assistants.  
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### 23 24 **Technical expertise**

25  
26 Zoo staff have a wide range of currently untapped knowledge that could easily  
27 become part of the solution in assisting in-situ programs build their own capacity to  
28 meet the goals of species recovery, such as grant writing, donor management,  
29 accounting principles, carpentry and construction skills, tree nursery management,  
30 studying animal behavior, and overall communication.  
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32  
33 A practical example includes the orangutan bridge experiment in Sabah. Following a  
34 visit to National Zoo in Washington DC (USA) where captive orangutans were using  
35 cables to move across the zoo, the Kinabatangan Orangutan Conservation  
36 Programme decided to erect bridges that would enable orangutans to cross water  
37 bodies that had become impassable following the destruction of large trees along  
38 riverbanks. Various zoos from Japan and Europe assisted KOCP in sourcing used fire  
39 hoses and weather-resistant webbing commonly used in captive settings, and in the  
40 design and building of these bridges. Orangutans, gibbons and many other species  
41 are now using these bridges regularly.  
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### 44 45 **Outreach campaigns: awareness and lobbying**

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47 Public outreach can go far beyond interpretation boards displayed inside the zoo  
48 premises, and modern day zoos need to use various forms of education to  
49 disseminate their message. A recent study confirmed the value of education at zoos  
50 and aquariums to engage members of the public with biodiversity-related issues and  
51 demonstrated that the aggregate impact from such experiences can be enhanced  
52 through coordinated public engagement initiatives (Moss *et al.*, 2017).  
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56 Typically zoos are using conservation education campaigns to raise funds and  
57 awareness about the plight of the orangutan. But they are also increasingly  
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3 promoting behavior changes of their public; a study found that including persuasive  
4 messages requesting behavior is often seen as a positive step, improving the visitor  
5 experience (Smith *et al.*, 2012). The issue of unsustainable palm oil production has  
6 offered an opportunity to have a positive impact on orangutan conservation through  
7 behavior change and advocacy. Indeed zoos are useful vehicles for disseminating  
8 information not only to the public but also to the industry or to the political world.  
9 They are therefore an important part of the palm oil debate.  
10

11  
12 Acknowledging that consumers can play a key role in increasing the demand for  
13 sustainably produced palm oil, zoos are beginning to develop and deliver lobbying  
14 and behavior change campaigns supported by zoological associations such as BIAZA  
15 and AZA who are encouraging their members to support certified sustainable  
16 practices. A genuine collaboration and dialogue between zoological institutions, in-  
17 situ groups and associations is needed to ensure that clear messages are promoted  
18 to the public. In Australia, the Zoos Victoria's "Don't Palm Us Off Campaign" was  
19 launched with the aims to increase awareness about palm oil, to make palm oil  
20 labeling compulsory in this country and to subsequently drive a market need for  
21 certified sustainable palm oil (Pearson *et al.*, 2014). A follow-up assessment showed  
22 that 80% of visitors were willing to change their future behavior to support  
23 orangutan conservation. This campaign was the first educational campaign of its  
24 kind in Australia and highlighted the importance of continued innovation in zoo-  
25 based conservation education and practice to maximize contributions to species  
26 conservation (Pearson *et al.*, 2014).  
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31 Campaigns in European zoos began around the "Clear Labels Not Forests" campaign  
32 in 2011. The campaign by NGOS and EAZA called for the successful bill for  
33 mandatory labelling of individual vegetable oil on food product packaging in the EU.  
34 A number of AZA members including Cheyenne Mountain Zoo and Philadelphia Zoo  
35 have led and supported public campaigns for support of sustainable palm oil, and in  
36 2015 Houston Zoo hosted the AZA Orangutan Species Survival Plan and Palm Oil  
37 Summit, bringing together zoos, NGOs and industry.  
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#### 41 **What is the future place of zoos in orangutan conservation?**

42  
43 As conservation organizations and as tourist attractions, zoos have the capacity to  
44 influence governments and industry in their own countries to encourage change. A  
45 key responsibility of zoological institutions is to work collaboratively with in-situ  
46 projects to develop a message that is reflective of the situation on the ground. But  
47 zoos also need to engage with unlikely partners to be successful in conservation  
48 campaigns; purely messaging to a zoo audience is unlikely to have a conservation  
49 impact and zoos should use their influence in the community to increase the scope  
50 of their messaging. New ways of thinking are needed to reach a larger audience.  
51 With the aim of increasing demand for sustainable palm oil, Chester Zoo's  
52 Sustainable Palm Oil Challenge is working with and reaching out to new audiences  
53 and partners not necessarily linked to the zoo, including the arts and theatre  
54 interested in food sustainability, restaurants to increase sustainable palm oil  
55 sourcing in the hospitality industry and reaching out to key organizations in the  
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3 region, using influence to increase support. BIAZA has engaged with the UK  
4 Government on sustainable palm oil through the UK roundtable, acting as an  
5 environmental voice on the group. Thirteen zoos globally are members of the  
6 Roundtable on Sustainable Palm oil (RSPO); and by doing so they are contributing to  
7 the global efforts to improve the practices of the palm oil industry.  
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10 Zoos such as Copenhagen Zoo have entered into partnerships alongside oil palm  
11 companies to collaborate on enhancing biodiversity on their sites, and the Zoological  
12 Society of London (ZSL) is working closely with industry through their Sustainable  
13 Palm Oil Transparency Toolkit (SPOTT), which includes scored assessment of the  
14 worlds' largest palm oil companies. These collaborations are a way forward for  
15 collaboration between NGOs and industry.  
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18 As tourist attractions with 700 million visitors per year globally, zoos should utilize  
19 their platform to communicate more to build public pressure around conservation  
20 issues and to become a spokesperson for wild orangutans. Consistent messaging  
21 from NGOs, zoo associations and individual zoos would encourage collaborative  
22 working and international campaigning across networks. Zoos could be perceived as  
23 neutral partners to facilitate dialogue between corporate partners, range-country  
24 conservationists and environmental organizations. They also could become one of  
25 the key partners to operate a shift in people's views that often opposes conservation  
26 and development.  
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