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Short Communication

Strategies for mitigating forest arson and elephant conflict in Way Kambas National Park, Sumatra, Indonesia

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Abstract

Forests in Indonesia are disappearing at an alarming rate, because the large population of poor rural people require land for agriculture. In Indonesia, forest fire is used to clear land and for protest, indirectly increasing opportunities for human-elephant interaction. Human-elephant conflict is a problem for elephant conservation and human wellbeing in all areas where elephants and humans compete for space, and is most severe in Asia. This paper presents a case study of poor rural people living near Way Kambas National Park, on the island of Sumatra. The park is valued for its critically endangered and endangered mega-fauna, but is a hotspot for both forest arson and human-elephant conflict. We describe the multifactorial conflict happening in the park, which involves arson, poaching, police brutality, and violation of elephants. Workshops with villagers and park stakeholders reveal villager-park interaction, and expose multiple levels of resentment and vicious retribution. Villagers resent the park for a multitude of reasons and take direct action, burning the park and killing elephants. We conclude that saving Way Kambas National Park will ultimately require construction of a barrier preventing human and elephant movement in and out of the park. However in the immediate term, successful conservation must understand and address villager-park conflict, respond to threats of arson, and help villagers protect farms from elephants.

Keywords: arson, conflict, conservation, elephant, fire, reforestation, Sumatra.

Les forêts en Indonésie sont en train de disparaître à un rythme alarmant, parce que la grande population des ruraux pauvres nécessite des terres pour l'agriculture. En Indonésie, les incendies de forêt est utilisé pour défricher des terres et de la protestation, augmentant indirectement les possibilités d'interaction homme-éléphant. Conflit homme-éléphant est un problème pour la conservation des éléphants et de bien-être humain dans tous les domaines où les éléphants et les humains sont en concurrence pour l'espace, et est la plus grave en Asie. Cet article présente une étude des populations rurales pauvres vivant à proximité du parc national Way Kambas, sur l'île de Sumatra. Le parc est apprécié pour ses méga-faune en danger critique et en voie de disparition, mais est un point chaud pour les incendies criminels des forêts et conflits homme-éléphant. Nous décrivons le conflit multifactorielle qui se passe dans le parc, ce qui implique des incendies criminels, le braconnage, la brutalité policière, et la violation des éléphants. Ateliers avec les villageois et les parties prenantes du parc révèlent l'interaction villageois-parc, et d'exposer de multiples niveaux de ressentiment et de vengeance vicieux. Les villageois ressentent le parc pour une multitude de raisons et de prendre des mesures directes, brûlant le parc et l'abattage des éléphants. Nous concluons que sauver le parc national Way Kambas sera en fin de compte la construction d'une barrière empêchant le mouvement humain et l'éléphant dans et hors du parc. Cependant, dans l'immédiat, la conservation réussie doit comprendre et adresse villageois parc conflit, face aux menaces d'incendie criminel, et aider les villageois à protéger les fermes des éléphants.

Mots-clés: incendies criminels, les conflits, la conservation, l'éléphant, le feu, reboisement, Sumatra.

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Introduction

Creation of national parks to preserve biodiversity can have unintended management consequences and create conflicts with adjacent and displaced communities, due to changes in land use rights and displacement of communities in and near the park [1]. Local people who historically used the land are prevented from continued use [1] and suffer the effects, such as crop raiding, of living in close proximity to wildlife populations [2]. This is a particular concern for subsistence communities often living season to season [2, 3].

Poverty and economic progress are the main concerns for rural people [3] in Indonesia, with approximately half the population living below or close to the poverty line [4]. Compounding this, many of Indonesia's impoverished people have been uprooted and disconnected through various policies of transmigration over the last century [5, 6], causing rapid expansion of human populations in the outer islands and subsequent destruction of forests and loss of wildlife through broad-scale land clearing and agricultural expansion [5-8]. The transmigration programme [5] established a population of people with weak traditional connections to the land they now inhabit, who see forests and biodiversity as a resource [7] to be exploited rather than a part of their cultural heritage to be preserved [2-8].

Indonesian forest laws state that *adat* law, permitting traditional activities by indigenous people [8-11], only applies to a few designated areas of forest. However, poor rural people consider the restrictions of *adat* law inherently unfair [8, 10, 11], with the result that *adat* law is widely invoked by local people who continue to use the forest in traditional ways [10-12]. Poor subsistence farmers in Indonesia traditionally use fire to convert forest to agricultural land, to improve hunting, and to protest against authority [11, 12, 15, 16]. The burning of forest is often seen as a legitimate activity, and where forest law conflicts with previous uses or traditional *adat* law [14-18], the forest law is ignored or defied. To rural people, changing the legal status of the land from free-use wilderness to protected forest unfairly obstructs their activities and erodes family security [11, 14, 16]. This conflict of views creates the potential for civil disobedience, which Indonesian rural societies express with forest arson, among other things [16-18].

In Indonesia, wild animals live in close proximity to poor agricultural communities [2], and on the large island of Sumatra, elephants and tigers are the main protagonists in human wildlife conflict [2], with elephants commonly raiding crops and causing financial distress [2]. In studies of elephant conflict in Way Kambas National Park [2, 19], elephant conflict is shown to be of such major problem that villagers guard their fields every night. Following trials of many methods to reduce conflict, including beehives, hot chili-pepper paste smeared on trees and fencing [20, 21], the government has constructed canals to prevent elephants passing out of the park, but as we reveal, the canals are poorly maintained and elephant conflict continues around the park.

We used Way Kambas National Park (WKNP) in Sumatra as a case study, to explore issues and drivers of villager-park conflict. Within WKNP there is ongoing conflict between park managers wishing to uphold the law and protect biodiversity, and villagers struggling to provide physical, social and economic security for the family. Villagers express resentment that the park protects biodiversity with little consideration of their immediate needs for security and income. This conflict drives vindictive retribution, compounding the problems of protecting the region's biodiversity. Our series of community interviews and meetings revealed that while park and conservation try to protect the forest and prevent arson, villagers, fearing elephants and financial ruin, continue to burn the park. We determine the key issues from the villagers' perspectives, and suggest a suite of actions that would reduce the level of human-wildlife conflict.

Methods

Study Area

WKNP is situated in Lampung province, on the island of Sumatra, Indonesia. Located on the south-eastern flood plains of Sumatra (Fig. 1), it comprises 1,300 square kilometres of lowland, fresh-water (non-peat) swamp forest. The park supports populations of critically endangered and endangered Sumatran fauna [22], including Sumatran rhinoceros (*Dicerorhinus sumatrensis*), Sumatran tiger (*Panthera tigris sumatrae*), Malayan tapir (*Tapirus indicus*) and Sumatran elephant (*Elephas maximus sumatranus*). From a 2005 survey, Sumatran elephant populations in the park are estimated at 180 individuals [23].

The rainforest habitat in WKNP is 75% degraded [23, 24] (Fig. 2), due to logging in the 1960s and '70s, and more recently, arson-induced wildfires. The annual burning of the park has modified the habitat significantly, with half of the land area dominated by degraded, highly flammable grasslands [24]. WKNP is bordered on the east by the Java Sea, and on the north and south by rivers, but on the western side the park directly abuts village farmlands. Due to the intense history of conflict over many years, it has been identified as a hotspot for human-elephant conflict [2, 20, 23].

Sampling

Community meetings were organised to discuss issues affecting relationships between WKNP management and adjacent communities. Focus group discussions with key informants revealed local beliefs, attitudes, and perceptions regarding fire, elephants, and other issues. The beliefs are significant because they are the drivers of human behaviour [25]. We applied qualitative research principles [26], asking open-ended questions to avoid leading the dialogue [26] and reflective listening techniques to encourage responses [27]. Meetings were structured around the Mirror Experience Effect [28], whereby trust and confidence were established by a repeating pattern, asking simple questions about park, fire, and solutions. We validated data in a three-tiered process [26], in which focus group meetings, a park stakeholder meeting, and one-on-one interviews

followed each other. At each phase, themes and patterns were tested, discussed, refined, and validated by group consensus.

Data were gathered at three focus group meetings, one stakeholder meeting, and a series of private interviews. The focus group meetings, with twenty participants, including fifteen villagers and five managers, were kept small to encourage contribution and participation, and were completed during a two-week period, May 24 to June 06, 2014. Park and community leaders were invited to attend a park stakeholder meeting. Results of the focus groups were presented to the stakeholders as a power point, and they were asked for comment, discussion, expansion, refinement, and finally for validation of the data. The fourteen stakeholders included project managers, field assistants, park managers, forest police, veterinarians, elephant managers, and local conservationists. Project managers and field assistants were drawn from habitat regeneration projects undertaken in the park. Researchers were approached by a further 10 individuals, who requested private interviews in order to impart information of a sensitive nature. Semi-structured interviews [26] were conducted to expand, refine, and validate the data. Because Indonesian society and work in the park are viewed as culturally masculine, most of the eighty-four study participants were men, with only nine female managers being involved. Informed consent was obtained prior to all interviews. Members of local conservation alliance, Alliansi Lestari Rimba Terpadu (ALeRT), provided translation of Indonesian language and local dialect.



Fig. 1: Map of Sumatra showing Way Kambas National Park in south-eastern corner [52].

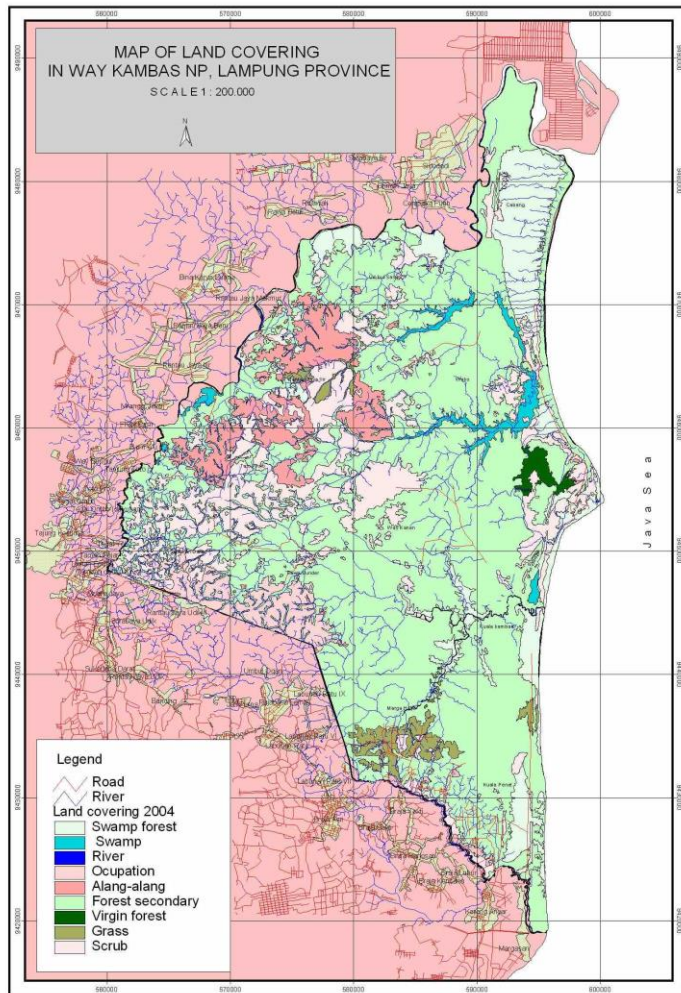


Fig. 2: Way Kambas National Park, 2004. Map of Way Kambas National Park showing degraded land area [53]

Results and Discussion

Successful conservation [29-31] integrates local villagers, so that they are heard, feel supported, and contribute to solutions. Nyhus [2] advises that the communities living close to the park should be included in programmes and benefits, as part of a “community buffer zone,” important for park protection. This should be more than simple appeasement, as genuine engagement means that the community impacted by decisions, and not just agency experts, can bring relevant knowledge to decisions [32, 33].

The results of this study (Appendix 1) consist of a number of community concerns, which were raised and discussed at the meetings. While research was designed to be qualitative, we tried to validate the data by use of reflective listening techniques and the three tiered system. Following are the points of consensus.

Human-elephant conflict

The community meetings revealed that of the multifarious issues and dynamics provoking conflict and compounding non-compliance in WKNP, crop raiding by elephants was the greatest issue.

Villagers, fearing calamitous injury and overwhelming property damage, are driven to take violent retribution against elephants and the park, including forest arson.

WKNP villagers believe that crop raiding increased when out-of-area elephants were captured and moved from forest remnants to WKNP in the 1980s [2]. Despite many schemes to mitigate human-elephant conflict [20, 21], elephants continue to forage on farms, leaving villagers financially exposed and in physical danger.

Villagers expressed their fear of impending calamity from elephants. They anticipate injury or death to farmer and family, destruction of farm and home, and income loss. In WKNP, where canals successfully obstruct elephant movement [19, 20], but are not well maintained, vigilant guarding systems remain essential for village protection. From community meetings a picture arose of the violent defence of farms, whereby villagers apply spiked foot-traps and guns to maim and kill elephants, or drive herds of elephants away from the park and across the highway as a form of protest against the park, increasing the likelihood of injury to elephants. While this study did not attempt to determine the elephant death rate from conflict, rangers reported evidence that it occurs and may be increasing.

Rangers, police, and elephant handlers with trained elephants, attempting to protect the village, get caught up in chaotic situations at night, with armed villagers and enraged elephants, and are unable to prevent the violence. Discussions revealed that villagers near WKNP resent the park's priority for protection of wildlife over villager concerns and its failure to maintain canals and ensure village safety.

Forest Fire conflict

Forest arson is rampant in the park, and Sutanto [24] asserts that 100% of forest fires in WKNP are man-made. Fire annually affects up to 50% of the land area of the park [24], creating vast degraded grasslands of low biological value [34, 35], exacerbating habitat decline, increasing biodiversity loss [36-38], and undermining the sustainability of regeneration activities [39].

Villagers of WKNP explained how fire is used to improve poaching outcomes and grow livestock fodder. Fire pushes back the forest edge [36, 40-42] and removes old grass, allowing fresh new green grass to grow. Fresh grass attracts herbivores, such as deer and boar for hunting, and is cut by farmers, who have insufficient land to grow fodder for livestock. Although villagers are concerned that taking deer and boar will result in tigers hunting for food in the village, hunters persist with their traditional practice.

While forest law prohibits arson [9], and there are heavy penalties for those found guilty of igniting fires in forests, including large fines and jail sentences [18], compliance is difficult to enforce [38, 41] and forest law enforcement remains weak [11, 14, 15]. Forest police in WKNP struggle to respond to rampant arson and illegal encroachment, and their efforts to maintain control have earned them a reputation for brutality.

The WKNP community meetings revealed that two levels of poaching occur in the park. On one level, poor villagers poach for sustainability, providing food for the family, but on another level, poachers are organised and rapacious, hunting with large dog packs to gain quick income from the bush-meat trade. Unsustainable over-hunting of bush-meat threatens wildlife populations [43], and systematic, organised bush-meat trade exploits both park and villagers [44]. Furthermore, community meetings

established an incontestable link between poaching and forest arson, as all poachers in WKNP light fires to improve hunting outcomes.

Consequently, forest arson destroys forest and habitat restoration efforts [39, 41], and rapacious bush-meat hunting drives park and police to respond with brutality. The result is a downward spiral of resentment, violent retribution, and revenge.

To improve governance and forest management, in 2009 the Ministry of Forestry [13] committed to oversee changes to rule of law, law enforcement, conflict resolution, decentralization, and dialogue-decision processes by improving transparency, accountability, and communication. The Ministry [13] also committed to preventing forest fires and expanding rehabilitation and conservation of degraded forests. However, WKNP villagers expressed perceptions that the police and judiciary have two sets of rules, and while villagers are arrested, beaten and jailed, rich and influential people seem immune to legal consequences. In WKNP, conservation is hampered by unsuccessful conflict resolution, and villagers continue to exploit the land freely.

Mitigation strategies

The complex conflict dynamic in WKNP involves forest arson, bush-meat hunting, elephant crop raiding, and villager revenge in the form of further arson and violation of elephants. Unable to eke out sufficient income from their small farms, villagers burn the land and hunt in the park; elephants, unable to find sufficient resources in the degraded park, supplement their needs from farmland; villagers, threatened and resentful, then set fire to the park and kill and maim elephants.

The future security of this valuable park appears in jeopardy, and conservation must understand, genuinely care about, and address community concerns to gain villagers' goodwill and secure the park. Saving WKNP requires government and international conservation with sufficient commitment to prevent elephants from leaving the park and prevent people from entering and burning the park. Community discussions suggest that the problems of the park can only be fully addressed by the construction of a physical barrier, preventing movement of both humans and elephants in and out of the park. However, immediate resolution at some level must be found for both forest arson and elephant killing.

In the case of WKNP, villager goodwill hinges on both improving economic opportunity and reducing elephant damage to farms. It was apparent from community meetings that villagers' feelings of insecurity and concerns about impending disaster need to be acknowledged, and crop raiding by elephants must be reduced to a level that villagers can tolerate.

Our discussions presented three strategies to reduce human-elephant conflict:

1. Increase villager resilience, by improving their economic security [21, 32, 45];
2. Improve villager sense of physical safety [46, 47], by preventing elephants from leaving the park; and
3. Reduce the need for elephants to forage in farms, by ensuring sufficient habitat, food, and fresh water from inside the park [23, 48].

1. Economic security

Improving the village economy is the most direct way to raise villagers' confidence and resilience and thereby increase their tolerance of elephants [49-51]. Villagers who have a diversity of incomes are less vulnerable when crops are lost. In WKNP opportunities exist for park employment, but they

are limited. Tourism provides work opportunity in hospitality, entertainment, merchandising, and other activities, and conservation provides jobs for field assistants in the park. Villagers who live near the WKNP entrance receive more benefit from park employment and consequently show more confidence and resilience. However, when conservation funding is limited [49-51] and sustainable incomes for many villagers require long-term projects, park employment is inherently difficult to support. If villager good will is to be gained for WKNP, then donors must be persuaded to support long-term projects and business development.

2. Village safety

In WKNP, where canals are degraded, elephants must be prevented from leaving the park. Hedges and Gunaryadi [20] found that the key to successful reduction of human-elephant conflict involves community-based guarding systems, with early warning and vigilant response. Conservation and habitat restoration projects could help support village protection, using existing watchtowers and reforestation personnel to watch for and help deter elephants, at minimal extra expense to projects.

3. Reducing the need for elephants to exit the park

Providing the needs of elephants from inside the park requires preventing forest arson, restoring habitat and food resources, and assuring fresh water availability. Due to almost total loss of reforestation and regrowth from fire prior to 2010, Sutanto [24] recommended long-term fire management be the first priority of habitat restoration projects. Natural elephant foods have been identified, using captive elephants from the WKNP Elephant Conservation Centre, and these can be planted in reforestation and natural regeneration areas. There is local and at present untested concern about rising salinity and lack of fresh water availability in the park during dry seasons, which requires further research. Rangers believe that animals are dying from lack of fresh water and thirst is driving elephants into villages.



A



B



C



D

Fig. 3: Photo. A: Frequent burning has converted forests to grassland forcing forest elephants onto farmland. Photo. B: Young elephants are orphaned after being separated from family groups, during human-elephant conflict events. Photo. C: National Park and ALERT Rangers install camera traps to survey fauna and identify poachers. Photo. D: Local farmers and project managers use a talking stick as a device to assist communication, during community meetings to discuss elephant/human conflict. (Photographs by David Lloyd)

Implications for Conservation

In WKNP, villagers and the park are in conflict over arson, poaching, human-wildlife conflict, law enforcement, and park management. While the park tries to protect forest and wildlife, the villagers continue to burn the forest (converting it to grassland), kill the wildlife, and violate elephants in contempt of the law (Fig. 3). We found that villagers are motivated by their need to survive and protect their families. We conclude that the future of both the forest and elephants are in jeopardy in Sumatra. One clear solution to the escalating violence against national parks is the construction of secure barriers to prevent elephant and human contact. However, in the immediate term, the conflict between the national park and the local communities must be resolved to a level that allows villagers to prosper and biodiversity to survive.

We recommend that conservation support reforestation projects with long-term fire protection strategies, offering long-term employment, planting elephant food trees, and providing early warning and response to elephant movement. Further, conservation should support research into the hypothesis that salinity is rising and fresh water is lacking in the park, placing wildlife at risk. If this is shown to be true, then fresh water solutions must be identified to save WKNP.

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Appendix 1

Record of responses from meetings at Way Kambas, June 2014

Study: WKNP 2014	Set up
	<p><i>FOCUS GROUP 1: 15 villagers and 5 managers, including 1 woman manager and 19 men. (20)</i></p> <p><i>FOCUS GROUP 2: 15 villagers and 5 managers, including 2 women managers and 18 men. (20)</i></p> <p><i>FOCUS GROUP 3: 15 villagers and 5 managers, all men. (20)</i></p> <p><i>STAKEHOLDER GROUP: 14 people, 4 of which were women. (14)</i></p> <p><i>PRIVATE INTERVIEWEES: 8 men and 2 women. (10)</i></p> <p><i>TOTAL: 84 participants</i></p>
Question 1: Can you tell us some positive things about living near Way Kambas National Park?	
Response	Detail
<i>#Number of participants engaged in topic discussion and consensus agreement</i>	
<p>Enjoying visits and gaining benefit from proximity of ECC</p> <p>#60</p>	<p>Local villagers can visit the Elephant Conservation Centre for entertainment, amusement and relaxation. They take picnics with family and watch the elephants.</p> <p>Villagers can gain extra income by selling handicrafts, picnic foods and fruits to visitors near entrance to ECC.</p>
<p>Support against foraging wild elephants</p> <p>#60</p>	<p>Villagers appreciate the support of the park in defending their fields from wild elephants. They said that recently this support had improved. The ECC sends trained elephants to drive wild herds back into the park.</p> <p>Villagers also said that staff employed by the park and conservation as fire fighters offer support against foraging</p>

	<p>elephants.</p> <p>Some villagers said they were recipients of development and social empowerment programs, instigated by the park, to improve park-villager relations and local economy.</p> <p>Villagers like to work on HEC contract programs for income and to help the villagers.</p> <p>Villagers said it would be better if fire look outs sent early warning to the villagers when elephants were in the area.</p>
<p>Park employment #60</p>	<p>Villagers were enthusiastic for work in the park, as this provided one of very few opportunities they have to improve their economy.</p> <p>Work includes guarding, elephant response, fire fighting.</p>
<p>Tourism opportunities #60</p>	<p>Villagers particularly enjoy tourists both local and international. They find visitors friendly and tourism gives them more opportunities to gain income. Because of the proximity of the park tourism creates opportunity for performance, selling and guiding.</p>
<p>Enjoyment of Nature #60</p>	<p>Villagers who have opportunity to work in the park said they learned to enjoy nature. They appreciate interaction with and education provided by conservation and park staff, with result they understand more about the park.</p> <p>They like to learn about the local wildlife, and their relevance to the world.</p> <p>Some villagers said they were proud of their local heritage and they like the responsibility of helping to protect it.</p>
<p>Conservation employment #60</p>	<p>Villagers made special mention of the value of work and income opportunities with reforestation projects.</p> <p>Conservation pays immediately, compared to Government positions.</p> <p>Some villagers said pay was too low to cover daily needs, particularly as jobs were shared. They requested more reforestation work. Villager, <i>“That is why I am at this meeting. I hope it leads to more projects. I need more work and incentive.”</i></p> <p>Villagers said that conservation projects employ villagers who</p>

	are living nearby, and this creates jealousy from other villagers who do not have the same opportunities. There was a feeling of pride in the park for villagers who gain from work opportunities in it.
Question 2: Can you tell us some negative things about living near Way Kambas National Park?	
Response	Detail
<i>#Number of participants engaged in topic discussion and consensus agreement</i>	
Poverty and lack of work #60	Villagers said, because the location is remote, there is a lack of work opportunity, so villagers are poor. In this situation “ <i>people light fires for economic reasons</i> ”, and hunting provides a “ <i>quick and easy economy</i> .” Villagers said they needed secure jobs with regular wages.
Crop raiding by wild elephants #84	Villagers described how elephants come out of the park every night. They said they had tried everything to stop the elephants. Elephants trample their fields, destroy crops, sometimes hurt or kill people. The result is injury and great economic loss. They said canals were successful but were poorly maintained and then elephants could cross over. They said they are always anxious, constantly guarding, never sleeping and often losing crops. When asked is HEC the biggest issue, villagers responded with unanimous YES. Stakeholders explained that 2014 was better because there was more support by park staff and the various park “ <i>resorts</i> ” (departments) had pooled resources. At private interviews some local people offered sensitive information, which they did not want others to hear them saying. They said that villagers were recently using guns and shooting elephants, putting out spiked/nailed planks to injure and cripple elephants, and that several elephants had been found dead near park boundary (Author: no formal data was available to corroborate these claims, but they are offered here

	<p>as a record of the conversations and due to their seriousness to conservation).</p> <p>In private conversation, elephant handlers described how they are expected to drive wild herds back to the forest, but said that with no police support, and villagers using guns and spiked planks, it was extremely dangerous for them and their elephants.</p> <p><i>“It can be difficult to drive off the elephants at night, because it is inconvenient (dangerous) if the people are shooting with guns, and the wild elephants are enraged. To fight an elephant you have to be face-to-face. If an elephant hits you side-on then you are done for. Your elephant can be pushed over. If the elephant herd breaks into small groups you don’t know where they are and they can come at your side or from behind.”</i></p> <p>Elephant handlers observed that elephant herds were breaking into small groups making it harder to drive them. They thought this was new behaviour.</p>
<p>Crop raiding by other wildlife</p> <p>#84</p>	<p>Other wildlife, which raid farms include wild boar, which root for cassava, but they are easier to deter than elephants.</p> <p>Some villagers observed that if local people keep hunting prey then tigers might start to hunt in the villages.</p> <p>Some rangers and conservationists thought wildlife came to the villages for fresh water. They observed that the park is flat and low-lying. They expressed concern about sea level rise and rising salinity in the park with climate change. They thought droughts were more severe and that more animals were dying in dry seasons. They said they had seen wildlife come into villages seeking fresh drinking water and they said they put out buckets of water in the park to help small wildlife.</p>
<p>Poaching</p> <p>#84</p>	<p>Some villagers said they support programs to end poaching but wished there were stronger penalties, because the ongoing conflict was destructive to community harmony.</p> <p>They said, while some poachers were needy villagers wanting food and small profit, many were out of area poachers taking vast numbers of prey and wanting a quick and easy profit.</p> <p>They quoted value of meat at market:</p> <p>Wild boar sells @ Rp 30,000/kg or Rp 300,000/beast (USD</p>

	<p>equivalent \$3/kg and \$30/beast);</p> <p>Deer meat sells @ Rp 60,000/kg or Rp 600,000/ beast (USD equivalent \$6/kg or \$60/beast).</p> <p>In private interview some participants said that park staff were involved in bush-meat trade for good profit.</p>
<p>Police brutality #84</p>	<p>Some villagers described that forest police were often brutal. Some villagers were motivated by revenge after being caught for poaching and beaten by forest police. They returned to the park lit forest fires.</p> <p>Group 4 described how law courts often failed to support forest police when villagers were arrested.</p> <p>In private, some participants said it was better to beat poachers and be done, than to try to seek justice in the courts. Villagers could be freed or face major sentences and the outcome was uncertain and inconsistent.</p>
<p>WKNP mismanagement #10</p>	<p>In private interview participants accused senior park staff of being involved in corrupt behavior.</p> <p>Their stories included:</p> <ol style="list-style-type: none"> a. Land inside the park being rented to villagers; b. Bush-meat trading; c. Contract hunting schemes; d. Misappropriation of park funds.
<p>Government unreliability #84</p>	<p>Villagers talked a lot about the elephant canals not being maintained, and said that government was not living up to its responsibility. They said government funds were often delivered late so that they were paid late and canals were not repaired regularly.</p> <p>In private there was concern about the failure of regular funds to the ECC, resulting in elephants being ill due to not receiving food or medicines, and elephant handlers not being paid on time.</p>
<p>Village Informers #84</p>	<p>Villagers said there was conflict with the park. Villagers were employed to inform on neighbours who poach, and these were vulnerable to villager revenge.</p>

	Private interviewees revealed corruption in the villager informant system, with informers working for both sides – informing to both park and poachers.
Forest fires #84	<p>All participants agreed fires are a great problem for WKNP. In 2011 more than 50% of the park area was burned and there is insufficient response capacity.</p> <p>According to villagers the link between fire and hunting is clear and that the vast majority of fires in WKNP are manmade. The reasons are poaching, revenge and growing fresh green livestock fodder.</p> <p>The strategy is to burn the land, then after rain new grass will grow, attracting deer and boar, and making it easier for hunting. Also new grass is harvested as fodder for feeding livestock.</p> <p>Villagers said that the way to stop arsonists was to provide good employment.</p>
Question 3: Can you tell us about any solutions to the problems of WKNP?	
Response	Detail
<i>#Number of participants engaged in topic discussion and consensus agreement</i>	
Village economic development #84	<p>All participants agreed that the most important thing to stop or improve conflict with the park is village economic development. Villagers asked for well-paid employment as well as business development opportunities.</p> <p>As ideas they offer eco-tourism, reforestation, fire fighting, guiding and other park activities for all villages to avoid jealousy.</p> <p><i>“ People want regular wages, not just daily pay. We need to plan and share the income around in village. ”</i></p>
Support village protection #84	<p>Villagers said reforestation projects were the first to know if elephants were moving into the area. They suggested that these projects, especially those with fire look out towers, could provide early warning to the villagers about elephants.</p> <p>To improve protection of villages, the elephant exit trails</p>

	<p>should be better guarded.</p> <p>Further, conservation and park staff could improve assistance to protect the village, and support villagers deterring elephants before they left the park.</p> <p>There was consensus that the park should step up both elephant and poacher guarding and response.</p>
<p>Improve Awareness Education, Build sense of pride and belonging</p> <p>#84</p>	<p>There was mixed response on the topic of education and awareness. Some villagers felt that everyone already knows the law, but others thought there was still value in education programs.</p> <p>But in general everyone agree in improving a sense of place and belonging, as well as pride in Indonesian wildlife and heritage.</p> <p><i>“Build a sense of pride for being the people who live around the park. Not only to the community, also to the (park) staff.”</i></p>
<p>Stop park crime</p> <p>#84</p>	<p>Most villagers strongly disliked park crime. They said it created anxiety and disharmony in the village. There was strong support for improved forest police action with zero tolerance for crime.</p> <p><i>“I think national parks should act firmly and no more tolerance for any illegal activity in the park.”</i></p> <p>Some villagers want to recruit park criminals into park employment, but others felt this was a complex solution, open to abuse, and needed clever management.</p>