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The status of Prey Lang 8th Monitoring Report with data from forest patrols

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On behalf of **Prey Lang Community Network** (PLCN):

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The Prey Lang Forest is located in the central plains of Cambodia, just west of the Mekong River. It covers approximately 500,000 hectares (ha) and spans four provinces: Kratie, Stung Treng, Kampong Thom and Preah Vihear. The forest supports seven distinct forest ecosystems, including swamp forests, evergreen, semi-evergreen and deciduous forests. Numerous rare and threatened plant and animal species are found in the area. Prey Lang is also a major watershed that feeds the Mekong River and the Tonle Sap Lake, both of which are crucial to the fisheries of local households and to the national economy and food security. Prey Lang also regulates local weather

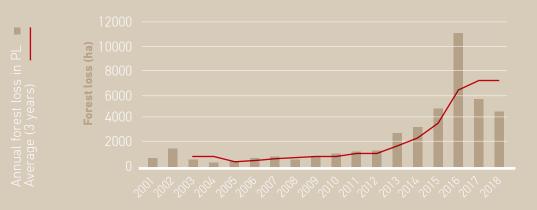
systems and helps mitigate climate change. Due to its national importance, Prey Lang was designated a Wildlife Sanctuary in 2016, covering 431,683 ha. The Cambodian government has issued a ban on all timber exports.

According to the University of Maryland², forest loss for the Prey Lang Wildlife Sanctuary was 4,563 ha. in 2018. (Fig. 1). This is equivalent to an average of 13 ha of forest destroyed every day or 18 football fields the size of Phnom Penh Olympic stadium (0.705 ha) cut down per day. The University of Maryland annual tree cover loss dataset measures the completeness of tree cover canopy in 30x30 meter pixels.

This measurement does not differentiate between permanent land cover change (deforestation) or temporary loss (in which forests will recover), nor between natural or human causes of loss. In addition, because optical satellite data collection can often be obscured by cloud cover in the humid tropics, some late-in-the-year loss may be picked up in the next year following persistent cloud cover. Global Forest Watch (GFW) therefore recommends using a three-year moving average to assess totals and trends in the tree cover loss data (shown in Fig 1). The total amount of forest loss between 2001 to 2018 was 41,758 ha or almost 10% of the Prey Lang Wildlife Sanctuary.

In 2001, communities living in and around Prey Lang began to advocate protecting their ancestral forest lands from large-scale illegal logging and land grabbing, which was destroying local communities' access to natural resources. Today, PLCN is a well-organised group of communities working to protect Prey Lang in collaboration with other stakeholders. PLCN conducts regular forest patrols to collect data on forest resources, illegal activities and climate change using a specially designed smartphone application known as the Prey Lang app. The data are analysed in collaboration with the University of Copenhagen and the results published in reports, press releases and on social media. PLCN's innovative approach to environmental justice continues to attract international attention and the network has been awarded four international prizes, most lately the Energy Globe Award 2019.

2 Hansen, M. C., P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, and J. R. G. Townshend. 2013. "High-Resolution Global Maps of 21st-Century Forest Cover Change." Science 342 (15 November): 850–53. Data available on-line from: https://earthenginepartners.appspot.com/science-2013-glob-al-forest/download_v1.6.html. Forest loss for 2018 in Prey Lang Wildlife Sanctuary calculated with Google Earth engine.



Forest loss

Figure 1. Forest loss in Prey Lang, 2001 - 2018
Brown bars show annual forest loss. Red line shows average forest loss over past three years.

MEET THE PATROLLERS

Mr. SVAY Sung was born in 1957. He is Kuy and lives in Ta Ngeun village, Vattanak commune, Sambou district, Kratie province together with his wife and six children. His family relies on farming, mainly rice, and harvesting of Non-Timber Forest Products. Sung became an active member of PLCN in 2000. He has devoted his life to protecting the forest and is pro-active in mobilising communities to protect Prey Lang as he believes it forms an intrinsic part of Kuy culture and spiritual life. In 2009, Sung became an active

ability to coordinate and collaborate within the network and with external partners, associations and networks. Sung has gained respect from communities and external stakeholders alike for his skills, persistency and hard work in protecting the forest. In 2015, Sung was elected as one of 28 PLCN core group members and is a respected elder working to coordinate and consolidate the network. Sung is a very active member of PLCN involved in advocacy activities, campaigns, patrols, networking and strengthening the membership base.

Image 1.1: Mr. Svay Sung PLCN core group membe



WHAT'S NEW SINCE LAST MONITORING

REPORT

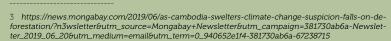
PLCN WINS THE ENERGY GLOBAL NATIONAL AWARD FOR CAMBODIA

PLCN received the National Energy Globe Award 2019 for their innovative environmental protection efforts in Cambodia. The Energy Globe Award was established 20 years ago, and its aim is "to present successful sustainable projects to a global audience and to demonstrate that for many environmental problems feasible solutions already exist". The international Energy Globe Award is known as "Nature's Nobel Prize" and one of the most prestigious environmental prizes worldwide, with winners selected by a jury made up of members from the UN Industrial Development Organisation, the World Bank and the European Renewable Energy Council.

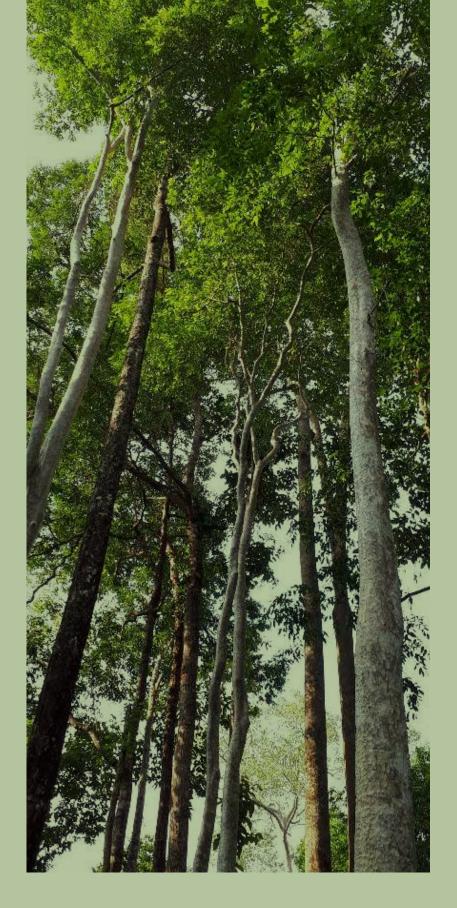
DEFORESTATION. A DRIVER OF CLIMATE CHANGE

Southeast Asia and Cambodia during March and April, more members of the public **connected extreme** weather events with climate change, according to a recent article from Mongabay³. Public criticism connecting deforestation to the higher temperatures was rejected by Neth Pheaktra, a Ministry of Environment spokesperson. Scientists have, however, repeatedly shown that deforestation contributes to climate change through increased CO2 emissions and reduced sequestration, as well as through in Cambodia, were found to create potential changes in water cycles. Forests absorb much of the sunlight that hits them. Non-forested areas, including concrete-heavy urban or industrial areas that often replace forests in developing nations, reflect sunlight, creating more heat at the ground level. Meanwhile, evaporating water from photosynthesis is

After the heatwave that baked responsible for 15 percent of all water vapor in the atmosphere. Fewer trees means less water vapor, which makes it harder for clouds to form. In turn, this leads to less precipitation and higher temperatures. A recent study⁴ explored the relationship between deforestation and increased temperatures and found that changing forest cover is a key driver of local climate change worldwide. Moreover, global deforestation leads to a consistent warming of the tropical and temperate regions, while higher deforestation rates, as even more intense warming. Despite the logging moratorium, log export ban and crackdowns on illegal timber trade from the government, Cambodia still has one of the highest deforestation rates in the world.



Prevedello, J. A., Winck, G. R., Weber, M. M., Nichols, E., & Sinervo, B. (2019). Impacts of forestation and deforestation on local temperature across the globe. PLOS ONE, 14(3). doi:10.1371/journal.



GOVERNMENT CRACKDOWN

ON ILLEGAL LOGGING

A collection of articles across the national and international media suggest that, in recent months, there has been a general increase in the Cambodian government's attention towards illegal logging and forest crimes. In January 2019, the Ministry of Agriculture, Forestry and Fisheries set up a permanent secretariat (the National Permanent Secretariat for the Prevention and Interception of Logging, Transporting, Collecting, Storing and Exporting of Rosewood), tasked with intercepting illegal timber, with a special focus on rosewood. Recent months also saw arrests of government officials charged with corruption and Chinese traders found guilty of forceful intimidation using weapons. The Committee for Forest Crime Prevention has furthermore announced **new strict** measures and the immediate destruction of seized tools used by illegal foresters.

Civil society actors have, however, commented that setting up new institutions, similar to the previously created Committee for Forest Crime Prevention, is not an effective solution to combatting forest crimes due to corruption and timber traders' close connections with government officials. Activists have furthermore called upon the government to expand their crackdown from individuals to companies, who often operate illegally and harvest and process protected and threatened tree species.

furthermore called upon the government to expand their crackdown from individuals to companies[...]".

EIA CALLS FOR ACTION REGARDING VIETNAM CITES **VIOLATION**

Siamese Rosewood is a luxury tree species growing in the Prey Lang Forest. Due to its high value, illegal loggers are targeting the species, as repeatedly reported by community patrols. Since 2013, the Cambodian government has imposed a ban on the rosewood trade. However, a September 2018 report by the Environmental Investigation Agency (EIA) highlighted the fact that neighbouring Vietnam has repeatedly ignored the ban and imported illegally harvested Cambodian rosewood using fake CITES (Convention on International Trade in Endangered Species) permits⁵.

The EIA has called for a rosewood trade moratorium with Vietnam and recommended that Vietnam declare all timber imports from Cambodia, enabling Cambodia to better tackle this illegal trade. The report highlighted that cross-country cooperation is crucial for curbing the illegal trade in luxury woods and the large-scale deforestation threatening Cambodia's protected areas, including Prey Lang.

APID DECLINE OF AMBODIA'S WILDLIFE

A number of articles in 2019 vast areas of land concessions reported the rapid decline of Cambodia's wildlife sanctuaries as a consequence of large-scale and uncontrolled deforestation^{6,7}. The country has one of the highest (ELCs) were noted as the primary deforestation rates in the world, threatening the very existence of with rising demand for rubber its wildlife sanctuaries. Reports and luxury woods being the show how Beng Per Wildlife drivers of forest conversion to Sanctuary has lost nearly 60 percent of its forest in the last 25 noted how small-scale loggers years. Similarly, Prey Lang Wildlife are cutting down trees beyond Sanctuary lost more than 100 the ELC boundaries and using square kilometres of tree cover in the ELCs to launder the wood. 2016 alone. At the country level. some 2,000 square kilometres of forests are lost annually due to the fact that the government grants

to large-scale agricultural companies every year, many of which are operating illegally8

Economic Land Concessions reason behind deforestation, plantations. However, reports also The issue is therefore a complex one and requires multi-layered interventions.

5 https://eia-international.org/wp-content/uploads/EIA-report-Vietnam-in-violation-spreads.

6 https://news.mongabay.com/2019/05/illegal-logging-poised-to-wipe-cambodian-wildlife-

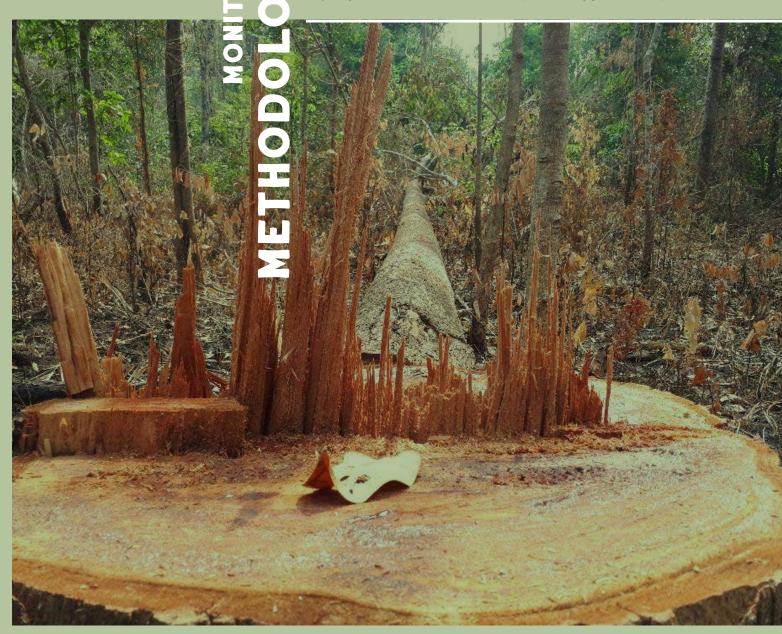
7 https://theaseanpost.com/article/cambodias-sanctuaries-under-threat?fbclid=IwAR3d0GBa-JsNOWvQcJDRvJU9pg16vyhpEXxn2Z9PwE_V5Z4pv_1MuPtYvWCc

Forest trends: Conversion Timber, Forest Monitoring, and Land-Use Governance in Cambodia, 2015 https://www.forest-trends.org/publications/conversion-timber-forest-monitoring-and-land-use-governance-in-cambodia/

The Prey Lang app was built based on the open-source smartphone app Sapelli that facilitates data collection across language or literacy barriers. The Prey Lang app documents events in four major categories:

"Activities" refers to extraction activities occurring in the Prey Lang area, such as illegal logging, illegal conversion of forest, illegal hunting, and illegal fishing.

"Resources" refers to natural or cultural resources and sites found in the Prey Lang area such as resin trees, medicinal plants, fishing grounds, and spirit forests.



- "Reporting" refers to two major subcategories: Positive interactions (mainly with the authorities) and negative interactions such as threats or violence towards patrol members, which can be documented with the newly introduced security component of the app.
- "Climate" refers to climate change observations or climate change mitigation strategies put in place by the communities around Prey Lang forest.

AP OF PLCN RECORDS LINKED TO EAR REAL-TIME SATELLITE

THE EUROPEAN COMMISSION'S JOINT RESEARCH CENTRE (JRC)



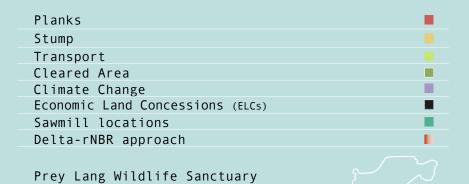


Image 2: Map showing the entries recorded from PLCN (coloured dots) paired with forest canopy disturbance events detected by the FCDM tool (Langner et al., 2018) for the period June 2018 to June 2019. The results of the FCDM tool Delta-rNBR approach are represented as a heat map, highlighting regions in which forest canopy cover disturbances were detected. The darker the red, the higher the spatial density of disturbance detections. Map constructed with qGIS 3.6.2 Noosa software. Note that each PLCN record may represent multiple entries (see enlarged areas below in Figs 2.1 and

Image 2.1 and 2.2: Enlarged Overlap between PLCN entries and forest canopy loss detected by FCDM tool (Langner et al., 2018) using satellite imagery from Sentinel 1 and Landsat 7 and 8.

The map in Image 2 shows the logging and climate change related PLCN records in Prey Lang Wildlife Sanctuary and surrounding areas for the period June 2018 - June 2019, PLCN documented 210 activities with GPS coordinates, mostly illegal logging (87%), while the rest relates reduced water levels in rivers and lakes. Heightened logging activity records can be observed around the ELCs and especially around the Think Biotech sawmill close to the Mekong River on southeast Kratie province.

PLCN's data are for the first time linked to a new near real-time forest monitoring

approach (FCDM tool combining DeltarNBR methodology9 with Delta-SPE methodology¹⁰) in collaboration with the European Commission's Joint Research Centre (JRC). A preliminary result (based only on Delta-rNBR methodology) was published at the European Space Agency Living Planet Symposium 2019 in Milan¹¹. to climate change observations such as The FCDM tool (able to run the DeltarNBR as well as the Delta-SPE approach) uses satellite imagery from Sentinel 1 as well as Landsat 7 and 8. The resulting map of forest canopy loss is considered conservative, showing too few rather than too many detections.

The two maps in Image 2.1 and 2.2 show multiple entries in two enlarged areas from Image 2.

Langner, A.; Miettinen, J.; Kukkonen, M.; Vancutsem, C.; Simonetti, D.; Vieilledent, G.; Verhegghen, A.; Gallego, J., Stibig, H.-J. Towards Operational Monitoring of Forest Canopy Disturbance in Evergreen Rain Forests: A Test Case in Continental Southeast Asia. Remote Sens. 2018, 10, 544.

Langner, A., et al. Monitoring large- and small-scale changes in vegetation cover in the dry and humid domain using multi-temporal Sentinel-1 data, in preparation

¹¹ Langner, A.; Theilade, I.; Nguyen, K.H.; Berger, D.; Argyriou, D.; Stibig, H.-J. Strengthening forest protection by near real-time forest disturbance monitoring (Delta-rNBR approach) - a case study in Cambodia, ESA Living Planet

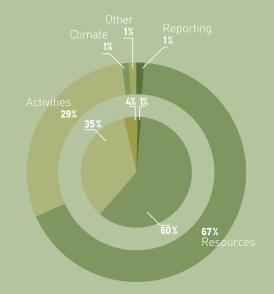
DISCUSSION

The ID of the results

	June'18 - June '19	Feb '15 - June '19
Total Entries	5144	23419
Validated Entries	3681	10731
Validated Rate	72%	46%
Average illegal logging entries per month	89	83%

Table 1: Number of entries, validation rate and average number of entries on illegal logging per month for the past year and for the total period in which the Prey Lang App has been in operation. Technical problems with the app between January and September 2017 meant that less data was uploaded and the period is not included in the analysis.

Between June 2018 and June 2019, the Prey Lang database received 5,144 entries of which 3,681 (72%) contained photo documentation, coordinates, time, date, and had a relevant category assigned. Only validated entries were included in the analysis. The validation rate was high regardless of three periods of training, testing sessions and new members joining the patrolling. Despite a recent lack of funding for regular patrols leading to potential underreporting of illegal logging, patrols reported an average of 89 illegal activities per month from June 2018 to June 2019 compared to an average of 83 logging cases per month since the beginning of the project. The records taken by the PLCN members were not normalised by their observation frequency and observation time; however, the patrols are bi-monthly for approximately the same number of days. Figure 2 shows the distribution of all validated entries for the latest period. In all, 67% of entries reported valuable resources (2.453 entries) while 29% related to illegal activities (1,080 entries). The rest of the categories (Climate change, Reporting interactions and Other) made up 4% of the entries (148 entries). The graph shows the distribution of entries for the total period in which the Prey Lang app has been in operation.

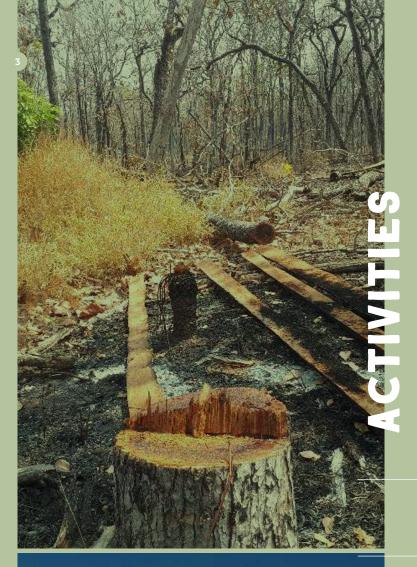


June 2018 - June 2019

Feb 2015 -June 2018

② Fntries distribution

Figure 2: Distribution (%) of total entries June 2018 to June 2019 and February 2015 to June 2019.



In the period between June 2018 and June 2019, **Activities was the second most reported category.** Illegal logging accounted for 97% of all entries while ELC mining, ELC plantation, illegal fishing and illegal hunting only constituted a minor proportion. This is consistent with documentation in previous years.

As described in Figure 3, within the category illegal logging, almost half of all entries reported stumps (49%), a proxy for harvesting of luxury trees, such as Chhertheal (Dipterocarpus alatus Roxb. & G.Don) (Img. 3), Korkoh (Sindora siamensis Mig.) and Pdeak (Anisoptera costata Korth.), often exported for use in high-end furniture production outside Cambodia. Furthermore, monitors regularly came across planks (24%) (back cover photo), which are usually left by loggers for later collection and transport. Cleared areas (12%) designates larger areas where all trees were removed for timber, farming, mining or other land-intensive activities (Img. 4). These clearings vary in size but previous reports suggest that they may be as large as 100 hectares.

Stumps 49%



Planks 24%



Transport 16%



Cleared areas 12%



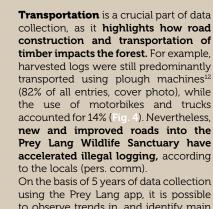
_ogging entries(

Figure 3: Distribution (%) of logging entries June 2018 to June 2019 as well as February 2015 to June 2019

Image 3: A stump of Chhertheal (Dipterocarpus alatus Roxb. & G.Don) found during a patrol in Stung Treng province, March 2019

Image 4: A cleared area within the Prey Lang Wildlife Sanctuary in the province of Stung Treng, January 2019





using the Prey Lang app, it is possible to observe trends in, and identify main threats to, the Prey Lang Forest.

Comparing the dry seasons of the last two years, we can see an increase in reported illegal activities in 2019 of more than 23% compared to the preceding dry season. The dry season in Cambodia lasts from December until April. (Fig. 5).

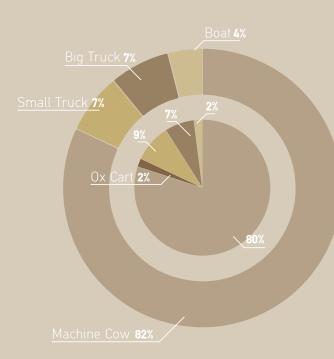
The rise in reported illegal activities highlights the urgency of concerted action against deforestation in order to safeguard Prey Lang Wildlife Sanctuary from total destruction.

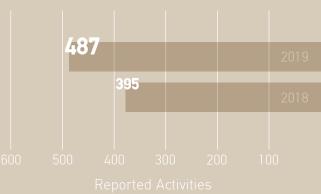
Plough machine or goh-yun in Khmer is a tractor and the most used means of forest transport

re 4: Distribution (%) of illegal timber transport entries June 2018 to June 2019 as well as February 2015 to June 2019)

Comparison of recorded activities during the dry season of 2018 and 2019 (Dry season: December-April)

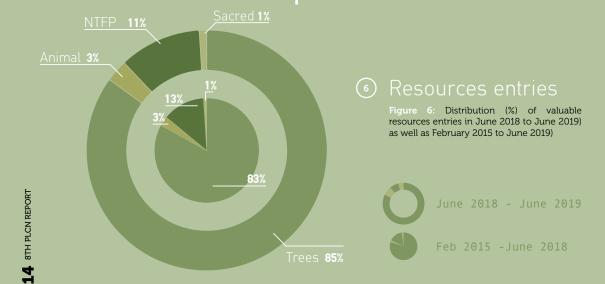












resources for the period June (Img. 3) and is endangered ac-2018 to June 2019. Most of the cording to the IUCN's Red List. entries) and sacred sites (20 entries). These percentages are similar to the results of the February 2015 to June 2019 period. na Oliv. ex A.W.Benn.) (Img. 7). Figure 7 shows the most re- Overall, four of the ten most reported species of trees. The most reported tree species is Chhertheal (Dipterocarpus alaprimarily for its resin. According being threatened by logging. to PLCN, this species was also

Figure 6 shows the recorded the most frequently logged entries were trees (2,113 en- The second most reported, tries), followed by NTFPs (273 and third most logged, speentries). The remaining two cies was Pdeak (Anisoptera categories were animals (84 costata Korth.), which is also endangered. The third most reported tree species was Chombork (Irvingia malayaported tree species are on the IUCN Red List. Prey Lang therefore has trees of high conservatus Roxb. & G.Don) (Img 8), used tion value but these species are

Chombork

Chhertheal

eanprey 101 70 Trach Pace Sralaò Pdeak Meanprey Korkoh Doungchem

Figure 7: Most important tree species measured as number of records since February 2015.

638 Chhertheal (Resin) Dipterocarpus alatus Roxb. & G.Don 439 Pdeak Anisoptera costata Korth. 331 Chombork Irvingia malayana Oliv. ex A.W.Benn. 233 Korkoh Sindora siamensis Miq. 141 Sralao' Lagerstroemia calyculata Kurz

Image 7: A Chombork tree (Irvin-

Image 8: A Chherteal Resin tree

(Dipterocarpus alatus Roxb. & G.

gia malayana Oliv. ex A.W.Benn.).

Dimocarpus longan Lour. 98 Doungchem Heritiera javanica (Blume) Kosterm.) 70 Trach (Resin) Dipterocarpus intricatus Dyer **64** Porpael Shorea roxburghii G. Don

62 Chrormas

101 Mean/Meanprey

Vatica odorata (Griff.) Symington

Calophyllum calaba var. bracteatum (Wight) P.F.Stevens

The most reported Non-Timber Forest reported species, Angraedaek (Dracaena angustifolia (Medik.) Roxb.), has various medicinal properties. For example, the leaves are brewed into a tea that enhances blood cired plant species. Ktong is a medicinal plant culation. Moreover, if the infusion is prepared with the leaves and flowers of Chnuo, it is considered an assistance to women giving birth as it stimulates the appetite and increases milk production. Finally, the young leaves are edible, and the timber is used to produce

Figure 8: Most important NTFP species according to the number of records since February 2015.

Paav Smarch Angraedaek Trormoong The Resin Chnark Saom Chnark AntongSor AntongSor AntongSor Chnark Saom Chnark AntongSor A Mushrooms

37 Ktong (Medicinal) (Ancistrocladus tectorius (Lour.) Merr.) 35 Chnou (Crafts) (Myrialepis paradoxa (Kurz) J. Dransf.) 29 Angraedaek (Medicinal) (Dracaena angustifolia (Medik.) Roxb.) 25 Mushrooms (Edible) (Different species) 15 Saom (Edible) (Daemonorops jenkinsiana (Griff.) Mart.) 13 Antong Sor (Medicinal) (Eurycoma longifolia Jack)

12 Resin (Crafts)

12 Paav (Edible)

(Licuala spinosa Wurmb) 6 Chnarb (Crafts)

(Areca triandra Roxb. ex Buch.-Ham.)

6 Trormoong (Edible)

(Garcinia oliveri Pierre)

5 Smarch (Edible)

(Syzygium zeylanicum (L.) DC.)



RECOMMENDATIONS FROM

PLCN

We, the Prey Lang Community Network (PLCN) of Kratie, Steung Treng, Preah Vihear and Kampong Thom, who voluntarily protect and monitor the Prey Lang Wildlife Sanctuary,

appreciation to the National relevant partners who have taken action on forest restoration and forest crime prevention.

We have monitored the government's forest restoration and crime prevention efforts closely. We have observed that the National Commission for Crime Prevention and Suppression of Natural Resources, the Ministry of Environment, and relevant partners have been working extremely hard on these issues. We recently saw how they have stopped and arrested powerful logging operations and stakeholders, closed down log storage facilities and sawmills, confiscated thousands of logs and destroyed the logging tools. These actions have been taken in an effort to protect the remaining forests.

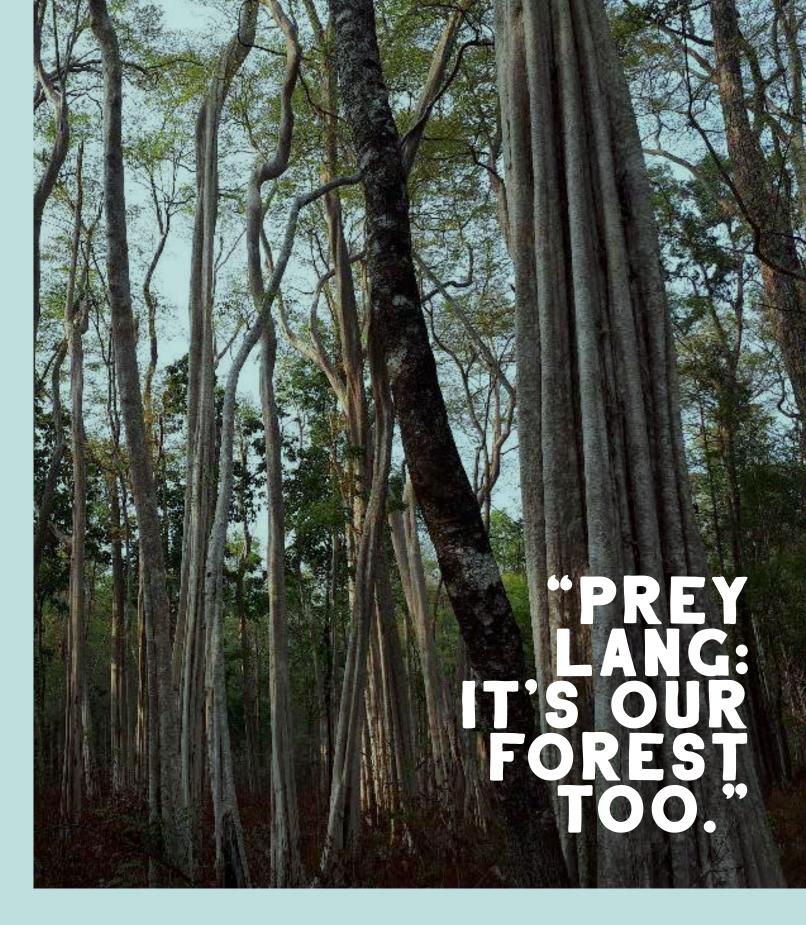
We have also seen that forest prevention and restoration activities are constantly being implemented by the Ministry of Environment and relevant partners, such as tree-planting participation, thus expressing the Cambodian government's commitment to natural resource protection.

We strongly hope and believe that

these forest restoration activities and crime suppression actions will continue without cease. We hope and expect that the National Commission for Crime Prevention and Suppression of Natural Resources will take swift action to close down Biotech Cambodia Co. Ltd., and the sawmills located in in Phom Kampong Damrei village, Beung Cha commune, Sambo district, Kratie province.

We greatly appreciate the aforementioned actions taken to protect and restore Prey Lang and we sincerely wish for the happiness and success of every official, officer, development partner, journalist, and forest community activist.

Sovanna Ek 097 644 9998/098 845 979 Thei Srey 099 722 187 Nee Menh 096 300 2762 Ly Chheang 096 668 0673



Front Cover Image: Plough machines caught

transporting illegal timber, in the province of Kratie, February 2019)

Back Cover Image: A PLCN patrol reports planks found in site, in the province of Kratie. (April 2019)



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University of Copenhagen invited the Ministry of Environment to comment on the report and received the following response:

"The Ministry of Environment is not in a position to provide comments to the draft report?

PLCN wishes to thank the Joint Research Centre (JRC of the European Commission) that provided technical support to deliver forest canopy disturbances using the FCDM tool interns of the Copenhagen University and all the people that offered their help voluntarily.

This report wouldn't be possible without them.

The Prey Lang app was built based on Sapelli: an open-source project that facilitates data collection across language or literacy barriers through highly configurable icon-driven user interfaces. For more info: http://www.sapelli.org/*
All photos are intellectual property of PLCN.
All maps were made with QCIS.3.6.2 Nosa.

The graphic design and all infographics were designed by Carolina Salassa (carolina salassa@outlook.it)
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