

NEWS, NOTES & EVENTS

The first issue of InJAST available in print and online

Dolly Priatna and **Kathryn A. Monk** (Eds.)

It is our great pleasure to announce that the very first issue of the Indonesian Journal of Applied Environmental Studies (InJAST) is now be available in both print and online. This journal has evolved from the Journal of Environmental Education which started in 2015, and was managed by the Study Programme of Population and Environmental Education, Graduate Programme of Pakuan University. Because this study programme has now become the Study Programme of Environmental Management, we have decided to establish this new journal to publish scientific articles covering broader environmental issues that are written by the Indonesian students of graduate programmes either in Pakuan and other universities or researchers. Meanwhile, the publication and management of the Journal of Environmental Education will be transferred to another relevant faculty or study programme within Pakuan University.

We intend the new InJAST to be published in English (with abstracts both in English and Bahasa) so that it can reach a wider readership internationally, and we hope encourage international environmental students and scientists working in Indonesia or on topics of specific relevance to Indonesia, to disseminate their research results and findings through this journal.

We are pleased to also announce that it has been agreed in principle that this new journal will be published collaboratively between the Graduate School of Pakuan University and PERWAKU (Perhimpunan Cendekiawan Pemerhati Lingkungan Indonesia, the Indonesian Association of Environmentalist Scholars). A formal Memorandum of Understanding between both parties will be signed in the near future.

In this occasion, we, as the chief editors of this new journal, would like to express our gratitude to various parties and individuals who have supported this initiative, especially to Prof. Dr. H. Bibin Rubini, M.Pd. (Chancellor of Pakuan University), Prof. Dr. Ing. H. Soewarto Hardhienata (Dean of Graduate School Pakuan University), and Prof. Jatna Supriatna, Ph.D. (Chairman of PERWAKU Indonesia). We would also like to express special thanks to our national and international colleagues at Pakuan University and elsewhere, who have so generously offered their time as members of the editorial board of the journal.

Last but not least, we hope that the Indonesian Journal of Applied Environmental Studies (InJAST) will provide new colour and perspectives the scientific journals published by Pakuan University, and become the vehicle of choice for environmental science students and scientists to disseminate of their work.

InJAST's website and online submission portal is:

<https://journal.unpak.ac.id/index.php/InJAST/index>

Submission can still be directed to the Chief Editors at: **injast@unpak.ac.id**

Comments on InJAST's website, reporting portal issues and other issues, emails should be addressed to the Editorial Manager at: **editor_injast@unpak.ac.id**

NOTES

Top 100 research questions in SE Asia

Southeast (SE) Asia holds high regional biodiversity and endemism levels but is also one of the world's most threatened regions. Local, regional and global threats could have severe consequences for the future survival of many species and the provision of ecosystem services. In the face of myriad pressing environmental problems, we carried out a research prioritisation exercise involving 64 experts whose research relates to conservation biology and sustainability in SE Asia. Experts proposed the most pressing research questions which, if answered, would advance the goals of biodiversity conservation and sustainable development in SE Asia. We received a total of 333 questions through three rounds of elicitation, ranked them (by votes) following a workshop and grouped them into themes. The top 100 questions depict SE Asia as a region where strong pressures on biodiversity interact in complex and poorly understood ways. They point to a lack of information about multiple facets of the environment, while exposing the many threats to biodiversity and human wellbeing. The themes that emerged indicate the need to evaluate specific drivers of biodiversity loss (wildlife harvesting, agricultural expansion, climate change, infrastructure development, pollution) and even to identify which species and habitats are most at risk. They also suggest the need to study the effectiveness of practice-based solutions (protected areas, ecological restoration), the human dimension (social interventions, organisational systems and processes and, the impacts of biodiversity loss and conservation interventions on people). Finally, they highlight gaps in fundamental knowledge of ecosystem function. These 100 questions should help prioritise and coordinate research, conservation, education and outreach activities and the distribution of scarce conservation resources in SE Asia.

Coleman et al. (2019). Top 100 research questions for biodiversity conservation in Southeast Asia. *Biological Conservation* **234**:211-220.

Forest fires and soil GHG emissions

Wildfires strongly regulate carbon (C) cycling and storage in boreal forests and account for almost 10% of global fire C emissions. However, the anticipated effects of climate change on fire regimes

may destabilize current C-climate feedbacks and switch the systems to new stability domains. Since most of these forests are located in upland soils where permafrost is widespread, the expected climate warming and drying combined with more active fires may alter the greenhouse gas (GHG) budgets of boreal forests and trigger unprecedented changes in the global C balance. Therefore, a better understanding of the effects of fires on the various spatial and temporal patterns of GHG fluxes of different physical environments (permafrost and nonpermafrost soils) is fundamental to an understanding of the role played by fire in future climate feedbacks. While large amounts of C are released during fires, postfire GHG fluxes play an important role in boreal C budgets over the short and long term. The timescale over which the vegetation cover regenerates seems to drive the recovery of C emissions after both low- and high-severity fires, regardless of fire-induced changes in soil decomposition. In soils underlain by permafrost, fires increase the active layer depth for several years, which may alter the soil dynamics regulating soil GHG exchange. In a scenario of global warming, prolonged exposition of previously immobilized C could result in higher carbon dioxide emission during the early fire succession. However, without knowledge of the contribution of each respiration component combined with assessment of the warming and drying effects on both labile and recalcitrant soil organic matter throughout the soil profile, we cannot advance on the most relevant feedbacks involving fire and permafrost. Fires seem to have either negligible effects on methane (CH₄) fluxes or a slight increase in CH₄ uptake. However, permafrost thawing driven by climate or fire could turn upland boreal soils into temporary CH₄ sources, depending on how fast the transition from moist to drier soils occurs. Most studies indicate a slight decrease or no significant change in postfire nitrous oxide (N₂O) fluxes. However, simulations have shown that the temperature sensitivity of denitrification exceeds that of soil respiration; thus, the effects of warming on soil N₂O emissions may be greater than on C emissions.

Ribeiro-Kumara et al. (2020). How do forest fires affect soil greenhouse gas emissions in upland boreal forests? A review. *Environmental Research* **184**:1-10.

Natural regeneration on degraded tropical peatland

Restoration of peat swamp forest (PSF) on degraded Southeast Asian peatlands could reduce global carbon emissions and biodiversity loss. However, multiple ecological barriers are believed to hinder natural regeneration of native trees on degraded peatland and make restoration expensive. We evaluated if natural PSF regeneration occurs and what factors may influence it on eight different land use and land cover (LULC) classes with different types of disturbance, including drainage and fire, in a retired *Acacia crassiparva* Benth. (*Acacia*) plantation landscape. The study involved 42 plots inside five PSF LULCs – intact, logged, burnt (1997, 2015), remnant and 212 plots at distances up to 2 km from the PSF edge in three *Acacia* plantation LULCs – unharvested, harvested, and burnt. The number of species per plot were similar between intact PSF (25 ± 6 (SD) per $20 \text{ m} \times 10 \text{ m}$ plot), logged forest (30 ± 6) and 1997 burnt forest (30 ± 13) but lower in 2015 burnt forest (11 ± 10) and remnant forest (18 ± 11). Regeneration away from the PSF across all degraded LULCs varied from fern dominated areas with no regeneration to clusters with high stem densities. The plantation LULCs, unharvested (94 species) and harvested *Acacia* (71 species), had similar overall species diversity after 3–4 years of regeneration to the intact and logged PSF (90 species). In unharvested *Acacia*, total species diversity, species per plot and stem density decreased with distance from forest edge (1–300 m – 87 species; 9 ± 6 (SD) species per $20 \text{ m} \times 10 \text{ m}$ plot; 1,056 stems/ha; 301–500 m – 33; 5 ± 2 ; 511 and >500 m – 38; 6 ± 3 ; 683). In harvested *Acacia*, there was low plot species diversity irrespective of distance from the forest (1–300 m – 51; 4 ± 2 ; 578; 301–500 m – 17; 4 ± 2 ; 1,100; >500 m – 48; 4 ± 2 ; 780). Factors which may influence regeneration differed between different LULCs, but there was a clear influence of distance from forest edge and dispersal mechanism – i.e. whether a tree was bird or mammal dispersed and the interaction between these two factors. While our study suggests that if not further disturbed by logging, drainage and/or fire, degraded PSF could regenerate naturally to a similar species diversity as intact PSF, the lower levels of natural regeneration further away from the forest may warrant selective planting of species which do not disperse over long distances. More study is needed on the factors facilitating natural regeneration, whether it leads to restoration

of PSF ecosystem functioning and the role of *Acacia* as a potential regeneration catalyst.

Wijedasa et al. (2020). Distance to forest, mammal and bird dispersal drive natural regeneration on degraded tropical peatland. *Forest Ecology and Management* **461**:1-10.

Water resources and climate changes

The present study evaluates the applicability performance of the Soil and Water Assessment Tool (SWAT) in small forested watersheds (less than 1000 km²). This open-source software is widely used in investigations focused on water availability and quality. Overall, SWAT model performance ranges between satisfactory to good. Normally, underestimates daily peak discharges. The limitations of the model are related to the accuracy of climate data used and to the time period used for validation. Watershed area, forest cover and streamflow spatial distribution have an important influence on modeling processes. Overall, from the analyzed studies, we observed for discharge a decreasing tendency, more pronounced towards the end of the 21st century (up to –54%). For surface runoff, was noticed the same decreasing tendency up to 41%. Regarding sediment yield, the results vary within very wide limits. These findings vary according to watershed location, scenarios adopted, and the eligible period of time.

Marin et al. (2020). Assessing the vulnerability of water resources in the context of climate changes in a small forested watershed using SWAT: A review. *Environmental Research* **184**:1-10.

Residential surrounding green, air pollution and traffic noise

Self-perceived general health (SGH) is one of the most inclusive and widely used measures of health status and a powerful predictor of mortality. However, only a limited number of studies evaluated associations of combined environmental exposures on SGH. Our aim was to evaluate associations of combined residential exposure to surrounding green, air pollution and traffic noise with poor SGH in the Netherlands. We linked data on long-term residential exposure to surrounding green based on the Normalized Difference Vegetation Index (NDVI) and a land-use database (TOP10NL), air pollutant concentrations (including particulate matter (PM₁₀, PM_{2.5}), and nitrogen dioxide (NO₂) and road- and rail-traffic noise with a Dutch national health survey,

resulting in a study population of 354,827 adults. We analyzed associations of single and combined exposures with poor SGH. In single-exposure models, NDVI within 300 m was inversely associated with poor SGH [odds ratio (OR) = 0.91, 95% CI: 0.89, 0.94 per IQR increase], while NO₂ was positively associated with poor SGH (OR = 1.07, 95% CI: 1.04, 1.11 per IQR increase). In multi-exposure models, associations with surrounding green and air pollution generally remained, but attenuated. Joint odds ratios (JOR) of combined exposure to air pollution, rail-traffic noise and decreased surrounding green were higher than the odds ratios of single-exposure models. Studies including only one of these correlated exposures may overestimate the risk of poor SGH attributed to the studied exposure, while underestimating the risk of combined exposures.

Klompaker et al. (2019). Residential surrounding green, air pollution, traffic noise and self-perceived general health. *Environmental Research* **179**:1-9.

The effects of compost

Incorporation of compost into soil can significantly alter soil physical properties, nutrient dynamics, and vegetation establishment. Strategic compost application to disturbed, degraded urban soil may provide benefits to soil properties. This review compared twenty-five peer-reviewed studies that evaluated changes in soil bulk density, infiltration rate, hydraulic conductivity, and water retention where compost was incorporated into urban soils. A wide range of compost rates and incorporation depths were evaluated in these studies across many soil types. Compost incorporation generally reduced bulk density, enhanced infiltration and hydraulic conductivity, and increased water content and plant available water, compared to unamended controls. In the four studies on runoff water quality, compost incorporation often resulted in higher initial nutrient content in runoff water, but also enhanced grass growth and reduced sediment loss. Few studies evaluated multiple compost application rates or incorporation depths, and the ways in which compost application rates were reported varied widely between studies making it difficult to directly compare them. Four studies investigated the long-term effects of compost incorporation, and there was no clear pattern of why some soils display enhanced physical properties over time and others do not. Compost was largely reported to have a positive

effect on degraded urban soils. Little research has focused on the longevity of compost in urban soils after one application, and thus, this would be a valuable topic of further investigation.

Kranz et al. (2020). The effects of compost incorporation on soil physical properties in urban soils – A concise review. *Journal of Environmental Management* **261**:1-10.

Ecologically functional riparian zones

Riparian zones contribute with biodiversity and ecosystem functions of fundamental importance for regulating flow and nutrient transport in waterways. However, agricultural land-use and physical changes made to improve crop productivity and yield have resulted in modified hydrology and displaced natural vegetation. The modification to the hydrology and natural vegetation have affected the biodiversity and many ecosystem functions provided by riparian zones. Here we review the literature to provide state-of-the-art recommendations for riparian zones in agricultural landscapes. We analysed all available publications since 1984 that have quantified services provided by riparian zones and use this information to recommend minimum buffer widths. We also analysed publications that gave buffer width recommendations to sustain different groups of organisms. We found that drainage size matters for nutrient and sediment removal, but also that a 3 m wide buffer zone acts as a basic nutrient filter. However, to maintain a high floral diversity, a 24 m buffer zone is required, while a 144 m buffer is needed to preserve bird diversity. Based on the analysis, we developed the concept of “Ecologically Functional Riparian Zones” (ERZ) and provide a step-by-step framework that managers can use to balance agricultural needs and environmental protection of waterways from negative impacts. By applying ERZ in already existing agricultural areas, we can better meet small targets and move towards the long-term goal of achieving a more functional land management and better environmental status of waterways.

Lind et al. (2019). Towards ecologically functional riparian zones: A meta-analysis to develop guidelines for protecting ecosystem functions and biodiversity in agricultural landscapes. *Journal of Environmental Management* **249**:1-8.

Novel entities and technologies:

Environmental benefits and risks

Novel technologies are continually being developed every day. Lessons from the past show that some resulted in unintended harm to the Earth's system. The challenge for organizations working at the interface of the environment, technology, and society is, therefore, how to best harness the environmental benefits from new technologies while minimizing their potential adverse effects. Here, we identify some of the emerging technologies that the international development community needs to consider as it seeks to take advantage of new technologies to promote sustainable development. There are several innovations – such as blockchain, nanotechnology, synthetic biology, cellular agriculture, and gene editing techniques that could either positively or negatively affect the environment, food security, human health, and the transition to clean energy. Some of their benefits and potential environmental and socio-economic concerns are discussed. We further suggest actions that can be taken by organizations involved in sustainable development, such as the United Nations and other global and regional bodies, to exploit the benefits from novel technologies and mitigate their risks.

Bierbaum et al. (2020). Novel entities and technologies: Environmental benefits and risks. *Environmental Science & Policy* **105**:134-143.

EVENTS

2020 World Environmental Day Spotlight on Biodiversity

World Environment Day is celebrated every year on 5 June to focus the world's attention on a pressing environmental issue. The Day strives to raise awareness and encourage action for the environment. It offers an opportunity to reflect on accomplishments and renew our resolve in overcoming the environmental challenges facing the world today. Held annually since 1974, World Environment Day is a vital platform for promoting progress on the environmental dimensions of the Sustainable Development Goals.

The 2020 World Environment Day global campaign highlights how we as humans are inextricably linked to and depend on nature for our existence and quality of life. The United Nations Environment Programme (UNEP) is calling on

governments, businesses and civil society to join hands in building global understanding of biodiversity and nature's key contribution to our survival. Nature shapes human cultures, inspiration and learning, physical and psychological experiences, and identities. The campaign will be launched in April 2020 to draw attention to the need for restoring nature and reversing biodiversity loss. It will feature a distinct visual identity and will run using the hashtag #ForNature. A key objective of the campaign will be to build understanding on how all living things on Earth are connected in the web of life. The campaign will develop many assets, including interactive visual stories to showcase the interdependence of all life on Earth, tied together through biodiversity chains. These links make up the fabric of nature—weakening or removing one form of life impacts the entire biodiversity chain, making species vulnerable to extinction and natural systems less resilient. As part of the campaign, UNEP will also be producing communication toolkits for partners, including the private sector, that will contain key messages and actions.

To celebrate World Environment Day (starting from 25 May and running through 5 June), UNEP invites the global community—families, friends, peers, neighborhoods, government and non-governmental organizations, and small and large businesses—to show their commitment to protecting nature and to the sustainable use of nature's resources. Since our connections to nature and biodiversity are anchored by our connections to each other, we are calling on partners to form chains of individuals and to share this powerful visual advocacy message with the wider community. Our goal is to underscore our resolve #ForNature and to amplify the plea of the 1 million species facing extinction by 2030. People can form these chains inside their office buildings or homes, outside in parks or playgrounds, or on the street. Chains can form a phrase or logo, a silhouette of a plant or an animal, run around trees or around a sustainable production unit or product. The more creative the better—the scope is to send a strong message in support of protecting nature. #ForNature human chains are a way to demonstrate our resolve to protect diversity of life on Earth and demand from world leaders' bold decisions and concrete actions. @UNEP will highlight these global efforts through its own channels and also through the use of #WorldEnvironmentDay and #ForNature hashtags.

2020 is a critical year for biodiversity. It's a year of crucial decisions for planet and people, and all other forms of life on Earth. While 2020 also concludes the United Nations Decade on Biodiversity, the scientific community continues to sound the alarm bells on global biodiversity breakdown. Living in harmony with nature—a goal world leaders have set for 2050—cannot be achieved unless we stop the loss of the planet's biodiversity by 2030. This leaves us with a decade for action, which will start with the 2020 United Nations Convention on Biological Diversity in October in Kunming, China and the design of a new 10-year framework for biodiversity. World Environment Day celebrations will help build momentum and rally the world community behind a more ambitious and robust framework that can lead to significant change.

IUCN World Conservation Congress 2020 postponed

Paris, France, 3 April 2020 - In light of the ongoing COVID-19 pandemic and to ensure the safety of participants and visitors, the International Union for Conservation of Nature (IUCN) and the French government have decided to postpone the IUCN World Conservation Congress 2020. Previously scheduled for 11 to 19 June 2020, it will now take place from 7 to 15 January 2021 in Marseille.

The COP 26 UN Climate Change Conferences Postponed

Bonn, 1 April 2020 - The COP26 UN climate change conference set to take place in Glasgow in November has been postponed due to COVID-19. This decision has been taken by the COP Bureau of the UNFCCC (United Nations Framework Convention on Climate Change), with the UK and its Italian partners. Dates for a rescheduled conference in 2021, hosted in Glasgow by the UK in partnership with Italy, will be set out in due course following further discussion with parties. In light of the ongoing, worldwide effects of COVID-19, holding an ambitious, inclusive COP26 in November 2020 is no longer possible.

Postponement of the 2nd World Environmental Law Congress

In light of rapid developments in the global health risks posed by COVID-19 and increasing complications for travel, the organizing committee has decided to postpone the 2nd World

Environmental Law Congress, the 3rd General Assembly for the Global Judicial Institute on the Environment, and associated events planned from 23 to 27 March 2020 in Rio de Janeiro, Brazil.

6th International EcoSummit Congress - EcoSummit 2020

The congress will take place at The Gold Coast Convention Centre, Gold Coast, Australia, from 21st-25th June 2020.

EcoSummit 2020 will have a focus on coastal and marine ecosystems including adjacent terrestrial ecosystems and all habitats that are integrated within those ecosystems, including river networks, wetlands and catchments. We expect all aspects of environmental modelling, engineering, science, and policy to be covered under the focus of climate adaptation and the need for developing socio-economic and environmental resilience and sustainable prosperity around the world. Further focus will be placed on fragile systems that are more likely to suffer the consequences of climate change and anthropogenic pressure such as islands, coastal communities and arid landscapes.