

**LEMBAR**  
**HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW**  
**KARYA ILMIAH : BOOK CHAPTER**

Judul Buku : Land Degradation and Community Resilience in Rural Mountain Area of Java, Indonesia. In: Shit P., Pourghasemi H., Bhunia G. (eds) *Gully Erosion Studies from India and Surrounding Regions*.

Jumlah Penulis : 3 penulis

Status Pengusul : **Iwan Rudiarto**, Isna Rahmawati, Anang Wahyu Sejati

Identitas Buku :

a. Judul Buku : Land Degradation and Community Resilience in Rural Mountain Area of Java, Indonesia. In: Shit P., Pourghasemi H., Bhunia G. (eds) *Gully Erosion Studies from India and Surrounding Regions*.

b. ISBN : 978-3-030-23242-9

c. Edisi : -

d. Tahun Terbit : 2019

e. Penerbit : Springer, Cham

f. Jumlah halaman : 483

g. DOI (jika ada) : [https://doi.org/10.1007/978-3-030-23243-6\\_30](https://doi.org/10.1007/978-3-030-23243-6_30)

h. Alamat web buku : [https://link.springer.com/chapter/10.1007/978-3-030-23243-6\\_30](https://link.springer.com/chapter/10.1007/978-3-030-23243-6_30)

Kategori Publikasi Karya Ilmiah :  *Book Chapter*

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Buku		Nilai Akhir Yang Diperoleh
	Internasional	Nasional	
	<input type="text" value="15"/>	<input type="text"/>	
a. Kelengkapan unsur isi buku (10%)	1,5		1,5
b. Ruang lingkup dan kedalaman pembahasan (30%)	4,5		4,0
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	4,5		4,0
d. Kelengkapan unsur dan kualitas terbitan/buku (30%)	4,5		4,5
<b>Total = (100%)</b>	<b>15</b>		14,0

Catatan Penilaian artikel oleh Reviewer:

- a. Unsur isi buku lengkap dimana terdapat daftar isi (judul dan nama penulis). Begitu juga dengan unsur artikel sudah sesuai dengan panduan penulisan artikel. Pembahasan dalam komponen artikel (pengantar, bahan dan metoda, hasil dan pembahasan, kesimpulan, dan daftar referensi) mencerminkan judul artikelnnya tentang degradasi lahan dan ketahanan komunitas di lokasi studi yang diteliti.
- b. Pembahasan mendalam dan didukung pustaka memadai dimana hubungan antara degradasi lahan dan ketahanan komunitas di wilayah pedesaan dijabarkan dengan baik dan sesuai dengan bidang ilmu penulis terutama konteks *rural mountain development and planning*. Pembahasan artikel melibatkan 24 sumber (67%) dimana sebagian besar berasal dari artikel jurnal.

- c. Metode yang digunakan *up to date* terutama berhubungan dengan *community resilience* di pedesaan yang masih sedikit dalam penelitiannya. Pustaka yang digunakan cukup mutakhir dimana terdapat 16 sumber (44%) dari total 36 pustaka dan diterbitkan dalam 10 tahun terakhir.
- d. *Book chapter* diterbitkan oleh Springer yang memiliki jaringan luas dan memiliki tautan DOI yang dilengkapi dengan ISBN dengan katagori internasional berbahasa inggris dari penulis berbagai negara seperti India, Bangladesh, Nepal, Indonesia, Malaysia, dan Iran.

Semarang, 14-01-2020  
Reviewer 1,



Prof. Dr.rer.nat. Imam Buchori, ST  
NIP. 197011231995121001  
Departemen PWK, FT. Undip

**LEMBAR**  
**HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW**  
**KARYA ILMIAH : BOOK CHAPTER**

Judul Buku : Land Degradation and Community Resilience in Rural Mountain Area of Java, Indonesia. In: Shit P., Pourghasemi H., Bhunia G. (eds) *Gully Erosion Studies from India and Surrounding Regions*.

Jumlah Penulis : 3 penulis

Status Pengusul : **Iwan Rudiarto**, Isna Rahmawati, Anang Wahyu Sejati

Identitas Buku :

a. Judul Buku : Land Degradation and Community Resilience in Rural Mountain Area of Java, Indonesia. In: Shit P., Pourghasemi H., Bhunia G. (eds) *Gully Erosion Studies from India and Surrounding Regions*.

b. ISBN : 978-3-030-23242-9

c. Edisi : -

d. Tahun Terbit : 2019

e. Penerbit : Springer, Cham

f. Jumlah halaman : 483

g. DOI (jika ada) : [https://doi.org/10.1007/978-3-030-23243-6\\_30](https://doi.org/10.1007/978-3-030-23243-6_30)

h. Alamat web buku : [https://link.springer.com/chapter/10.1007/978-3-030-23243-6\\_30](https://link.springer.com/chapter/10.1007/978-3-030-23243-6_30)

Kategori Publikasi Karya Ilmiah :  *Book Chapter*

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Buku		Nilai Akhir Yang Diperoleh
	Internasional <input type="text" value="15"/>	Nasional <input type="text"/>	
a. Kelengkapan unsur isi buku (10%)	1,5		1,0
b. Ruang lingkup dan kedalaman pembahasan (30%)	4,5		4,0
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	4,5		4,0
d. Kelengkapan unsur dan kualitas terbitan/buku (30%)	4,5		4,0
<b>Total = (100%)</b>	<b>15</b>		<b>13,0</b>

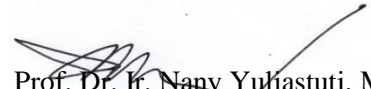
Catatan Penilaian artikel oleh *Reviewer*:

- a. Penulisan artikel lengkap sesuai dengan petunjuk penulisan (author guidelines). Isi artikel tentang penilaian tingkat ketahanan dari kejadian degradasi lahan di lokasi studi merepresentasikan judul yang diangkat.
- b. Isi artikel tentang Land Degradation cukup dibahas dengan interpretasi baik dan sesuai dengan bidang ilmu penulis terutama berhubungan dengan pengembangan pedesaan dalam konteks penggunaan sumber daya lahan. Pembahasan menggunakan rujukan sebanyak 67% dari total pustaka yang digunakan (36 pustaka).
- c. Artikel *book chapter* memiliki nilai kebaruan dimana penelitian yang menilai hubungan degradasi lahan dan ketahanan masyarakatnya masih tergolong sedikit. Penggunaan sumber pustaka primer di bawah 10 tahun dirasa cukup (44%) dengan similarity index 4%.

d. Penerbit Springer dan dilengkapi dengan DOI dan juga tautan online-nya yang bisa di akses dengan berbayar dan ber-ISBN. *Book chapter* termasuk katagori internasional berbahasa inggris dilengkapi dengan informasi *editorial board* dan juga *contributors* (penulis) dari berbagai negara.

Semarang, 07-02-2020

Reviewer 2,



Prof. Dr. Ir. Nany Yuliasuti, MSP

NIP. 195407171982032001

Departemen PWK, FT. Undip

**LEMBAR**  
**HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW**  
**KARYA ILMIAH : BOOK CHAPTER**

Judul Buku : Land Degradation and Community Resilience in Rural Mountain Area of Java, Indonesia. In: Shit P., Pourghasemi H., Bhunia G. (eds) *Gully Erosion Studies from India and Surrounding Regions*.

Jumlah Penulis : 3 penulis

Status Pengusul : **Iwan Rudiarto**, Isna Rahmawati, Anang Wahyu Sejati

Identitas Buku :

a. Judul Buku : Land Degradation and Community Resilience in Rural Mountain Area of Java, Indonesia. In: Shit P., Pourghasemi H., Bhunia G. (eds) *Gully Erosion Studies from India and Surrounding Regions*.

b. ISBN : 978-3-030-23242-9

c. Edisi : -

d. Tahun Terbit : 2019

e. Penerbit : Springer, Cham

f. Jumlah halaman : 483

g. DOI (jika ada) : [https://doi.org/10.1007/978-3-030-23243-6\\_30](https://doi.org/10.1007/978-3-030-23243-6_30)

h. Alamat web buku : [https://link.springer.com/chapter/10.1007/978-3-030-23243-6\\_30](https://link.springer.com/chapter/10.1007/978-3-030-23243-6_30)

Kategori Publikasi Karya Ilmiah :  *Book Chapter*

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Reviewer		Nilai Rata-rata
	Reviewer I	Reviewer II	
a. Kelengkapan unsur isi buku (10%)	1,5	1,0	1,25
b. Ruang lingkup dan kedalaman pembahasan (30%)	4,0	4,0	4,0
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	4,0	4,0	4,0
d. Kelengkapan unsur dan kualitas terbitan/buku (30%)	4,5	4,0	4,25
<b>Total = (100%)</b>	14,0	13,0	13,5

Semarang, 09-03-2020

Reviewer 1,



Prof. Dr. rer. nat. Imam Buchori, ST  
 NIP. 197011231995121001  
 Departemen PWK FT.Undip

Reviewer 2,



Prof. Dr. Ir. Nany Yuliasuti, MSP  
 NIP. 195407171982032001  
 Departemen PWK FT.Undip

**LEMBAR**  
**HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW**  
**KARYA ILMIAH : BOOK CHAPTER**

Judul Buku : Land Degradation and Community Resilience in Rural Mountain Area of Java, Indonesia. In: Shit P., Pourghasemi H., Bhunia G. (eds) *Gully Erosion Studies from India and Surrounding Regions*.

Jumlah Penulis : 3 penulis

Status Pengusul : **Iwan Rudiarto**, Isna Rahmawati, Anang Wahyu Sejati

Identitas Buku :

a. Judul Buku : Land Degradation and Community Resilience in Rural Mountain Area of Java, Indonesia. In: Shit P., Pourghasemi H., Bhunia G. (eds) *Gully Erosion Studies from India and Surrounding Regions*.

b. ISBN : 978-3-030-23242-9

c. Edisi : -

d. Tahun Terbit : 2019

e. Penerbit : Springer, Cham

f. Jumlah halaman : 483

g. DOI (jika ada) : [https://doi.org/10.1007/978-3-030-23243-6\\_30](https://doi.org/10.1007/978-3-030-23243-6_30)

h. Alamat web buku : [https://link.springer.com/chapter/10.1007/978-3-030-23243-6\\_30](https://link.springer.com/chapter/10.1007/978-3-030-23243-6_30)

Kategori Publikasi Karya Ilmiah :  *Book Chapter*

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Buku		Nilai Akhir Yang Diperoleh
	Internasional <input type="text" value="15"/>	Nasional <input type="text"/>	
a. Kelengkapan unsur isi buku (10%)	1,5		1,25
b. Ruang lingkup dan kedalaman pembahasan (30%)	4,5		4,0
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	4,5		4,0
d. Kelengkapan unsur dan kualitas terbitan/buku (30%)	4,5		4,25
<b>Total = (100%)</b>	<b>15</b>		<b>13,5</b>

Semarang, 09-03-2020

Reviewer 1,



Prof. Dr. rer. nat. Imam Buchori, ST  
 NIP. 197011231995121001  
 Departemen PWK FT.Undip

Reviewer 2,



Prof. Dr. Ir. Nany Yuliasuti, MSP  
 NIP. 195407171982032001  
 Departemen PWK FT.Undip

Advances in Science, Technology & Innovation  
IEREK Interdisciplinary Series for Sustainable Development

Pravat Kumar Shit · Hamid Reza Pourghasemi  
Gouri Sankar Bhunia *Editors*

# Gully Erosion Studies from India and Surrounding Regions

EXTRAS ONLINE



 Springer

---

# Advances in Science, Technology & Innovation

## IEREK Interdisciplinary Series for Sustainable Development

### Editorial Board Members

Anna Laura Pisello, Department of Engineering, University of Perugia, Italy  
Dean Hawkes, University of Cambridge, Cambridge, UK  
Hocine Bougdah, University for the Creative Arts, Farnham, UK  
Federica Rosso, Sapienza University of Rome, Rome, Italy  
Hassan Abdalla, University of East London, London, UK  
Sofia-Natalia Boemi, Aristotle University of Thessaloniki, Greece  
Nabil Mohareb, Faculty of Architecture - Design and Built Environment, Beirut Arab University, Beirut, Lebanon  
Saleh Mesbah Elkaffas, Arab Academy for Science, Technology, Egypt  
Emmanuel Bozonnet, University of la Rochelle, La Rochelle, France  
Gloria Pignatta, University of Perugia, Italy  
Yasser Mahgoub, Qatar University, Qatar  
Luciano De Bonis, University of Molise, Italy  
Stella Kostopoulou, Regional and Tourism Development, University of Thessaloniki, Thessaloniki, Greece  
Biswajeet Pradhan, Faculty of Engineering and IT, University of Technology Sydney, Sydney, Australia  
Md. Abdul Mannan, Universiti Malaysia Sarawak, Malaysia  
Chaham Alalouch, Sultan Qaboos University, Muscat, Oman  
Iman O. Gawad, Helwan University, Egypt  
Anand Nayyar, Duy Tan University, Da Nang, Vietnam

### Series Editor

Mourad Amer, International Experts for Research Enrichment and Knowledge Exchange (IEREK), Cairo, Egypt



**Advances in Science, Technology & Innovation (ASTI)** is a series of peer-reviewed books based on the best studies on emerging research that redefines existing disciplinary boundaries in science, technology and innovation (STI) in order to develop integrated concepts for sustainable development. The series is mainly based on the best research papers from various IEREK and other international conferences, and is intended to promote the creation and development of viable solutions for a sustainable future and a positive societal transformation with the help of integrated and innovative science-based approaches. Offering interdisciplinary coverage, the series presents innovative approaches and highlights how they can best support both the economic and sustainable development for the welfare of all societies. In particular, the series includes conceptual and empirical contributions from different interrelated fields of science, technology and innovation that focus on providing practical solutions to ensure food, water and energy security. It also presents new case studies offering concrete examples of how to resolve sustainable urbanization and environmental issues. The series is addressed to professionals in research and teaching, consultancies and industry, and government and international organizations. Published in collaboration with IEREK, the ASTI series will acquaint readers with essential new studies in STI for sustainable development.

More information about this series at <http://www.springer.com/series/15883>

---

Pravat Kumar Shit • Hamid Reza Pourghasemi •  
Gouri Sankar Bhunia  
Editors

# Gully Erosion Studies from India and Surrounding Regions

 Springer

*Editors*

Pravat Kumar Shit  
Department of Geography  
Raja N. L. Khan Women's College (Autonomous)  
Medinipur, West Bengal, India

Hamid Reza Pourghasemi  
Department of Natural Resources  
and Environmental Engineering  
College of Agriculture, Shiraz  
University  
Shiraz, Iran

Gouri Sankar Bhunia  
Aarvee Associates Architects  
Engineers & Consultants Pvt. Ltd  
Hyderabad, India

ISSN 2522-8714                      ISSN 2522-8722 (electronic)  
Advances in Science, Technology & Innovation  
IEREK Interdisciplinary Series for Sustainable Development  
ISBN 978-3-030-23242-9              ISBN 978-3-030-23243-6 (eBook)  
<https://doi.org/10.1007/978-3-030-23243-6>

© Springer Nature Switzerland AG 2020

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG.  
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

---

## Contents

<b>1</b>	<b>Spatial Extent, Formation Process, Reclaimability Classification System and Restoration Strategies of Gully and Ravine Lands in India . . . . .</b>	<b>1</b>
	Gopal Kumar, Partha Pratim Adhikary, and Ch. Jyotiprava Dash	
<b>2</b>	<b>Soil Disintegration Characteristics on Ephemeral Gully Collapsing in Lateritic Belt of West Bengal, India . . . . .</b>	<b>21</b>
	Pravat Kumar Shit and Partha Pratim Adhikary	
<b>3</b>	<b>Modeling of Gully Erosion Based on Random Forest Using GIS and R . . . . .</b>	<b>35</b>
	Amiya Gayen, Sk. Mafizul Haque, and Sunil Saha	
<b>4</b>	<b>Geomorphic Threshold and SCS-CN-Based Runoff and Sediment Yield Modelling in the Gullies of Dwarka–Brahmani Interfluve, West Bengal, India . . . . .</b>	<b>45</b>
	Sandipan Ghosh and Sanat Kumar Guchhait	
<b>5</b>	<b>Assessing Gully Asymmetry Based on Cross-Sectional Morphology: A Case of Gangani Badland of West Bengal, India . . . . .</b>	<b>69</b>
	Aznarul Islam, Biplab Sarkar, Balai Chandra Das, and Suman Deb Barman	
<b>6</b>	<b>The Potential Gully Erosion Risk Mapping of River Dulung Basin, West Bengal, India Using AHP Method . . . . .</b>	<b>93</b>
	Kishor Dandapat, Rajkumar Hazari, Gouri Sankar Bhunia, and Pravat Kumar Shit	
<b>7</b>	<b>Application of Field-Monitoring Techniques to Determine Soil Loss by Gully Erosion in a Watershed in Deccan, India . . . . .</b>	<b>109</b>
	Veena U. Joshi	
<b>8</b>	<b>Gully Erosion Susceptibility Mapping Based on Bayesian Weight of Evidence . . . . .</b>	<b>133</b>
	Pravat Kumar Shit, Gouri Sankar Bhunia, and Hamid Reza Pourghasemi	
<b>9</b>	<b>Understanding the Morphology and Development of a Rill-Gully: An Empirical Study of Khoai Badland, West Bengal, India . . . . .</b>	<b>147</b>
	Asish Saha, Manoranjan Ghosh, and Subodh Chandra Pal	
<b>10</b>	<b>Estimation of Erosion Susceptibility and Sediment Yield in Ephemeral Channel Using RUSLE and SDR Model: Tropical Plateau Fringe Region, India . . . . .</b>	<b>163</b>
	Raj Kumar Bhattacharya, Nilanjana Das Chatterjee, and Kousik Das	
<b>11</b>	<b>Assessment of Potential Land Degradation in Akarsa Watershed, West Bengal, Using GIS and Multi-influencing Factor Technique . . . . .</b>	<b>187</b>
	Ujjal Senapati and Tapan Kumar Das	

<b>12 Using Ground-Based Photogrammetry for Fine-Scale Gully Morphology Studies: Some Examples . . . . .</b>	<b>207</b>
Priyank Pravin Patel, Rajarshi Dasgupta, and Sayoni Mondal	
<b>13 Effects of Grass on Runoff and Gully Bed Erosion: Concentrated Flow Experiment . . . . .</b>	<b>221</b>
Pravat Kumar Shit, Hamid Reza Pourghasemi, and Gouri Sankar Bhunia	
<b>14 Water Flow-Induced Gully Erosion in Himalayan Watershed Cum Plateau and Alluvial Plains . . . . .</b>	<b>235</b>
Anand Verdhen	
<b>15 Influence of Road-Stream Crossing on the Initiation of Gully: Case Study from the Terai Region of Eastern India . . . . .</b>	<b>251</b>
Suwendu Roy	
<b>16 Land Degradation Processes of Silabati River Basin, West Bengal, India: A Physical Perspective . . . . .</b>	<b>265</b>
Avijit Mahala	
<b>17 Assessment of Gully Erosion and Estimation of Sediment Yield in Siddheswari River Basin, Eastern India, Using SWAT Model . . . . .</b>	<b>279</b>
Amit Bera, Bhabani Prasad Mukhopadhyay, and Swagata Biswas	
<b>18 Role of Plant Roots to Control Rill-Gully Erosion: Hydraulic Flume Experiment . . . . .</b>	<b>295</b>
Pravat Kumar Shit, Hamid Reza Pourghasemi, and Gouri Sankar Bhunia	
<b>19 Bamboo-Based Technology for Resource Conservation and Management of Gullied Lands in Central India . . . . .</b>	<b>307</b>
S. Kala, A. K. Singh, B. K. Rao, H. R. Meena, I. Rashmi, and R. K. Singh	
<b>20 Soil Erosion Protection on Hilly Regions Using Plant Roots: An Experimental Insight . . . . .</b>	<b>321</b>
R. Gobinath, G. P. Ganapathy, Isaac I. Akinwumi, E. Prasath, G. Raja, T. Prakash, and G. Shyamala	
<b>21 Planning, Designing and Construction of Series of Check Dams for Soil and Water Conservation in a Micro-watershed of Gujarat, India . . . . .</b>	<b>337</b>
Deodas Meshram, S. D. Gorantiwar, Saurabh Samadhan Wadne, and K. C. Arun Kumar	
<b>22 Impacts of Gully Erosion on River Water Quality and Fish Resources: A Case Study . . . . .</b>	<b>345</b>
Avijit Kar, Deep Sankar Chini, Manojit Bhattacharya, Basanta Kumar Das, and Bidhan Chandra Patra	
<b>23 Gully Erosion in I. R. Iran: Characteristics, Processes, Causes, and Land Use . . . . .</b>	<b>357</b>
Majid Soufi, Reza Bayat, and Amir Hossein Charkhabi	
<b>24 Factors Affecting Gully-Head Activity in a Hilly Area Under a Semiarid Climate in Iran . . . . .</b>	<b>369</b>
Narges Kariminejad, Mohsen Hosseinalizadeh, Hamid Reza Pourghasemi, Majid Ownegh, and Mauro Rossi	
<b>25 Topographic Threshold of Gully Erosion in Iran: A Case Study of Fars, Zanjan, Markazi and Golestan Provinces . . . . .</b>	<b>381</b>
Majid Soufi, Reza Bayat, Aliakbar Davudirad, Majid Zanjanijam, and Hossein Esaei	

<b>26</b>	<b>A Review on the Gully Erosion and Land Degradation in Iran . . . . .</b>	<b>393</b>
	Mohsen Hosseinalizadeh, Mohammad Alinejad, Ali Mohammadian Behbahani, Farhad Khormali, Narges Kariminejad, and Hamid Reza Pourghasemi	
<b>27</b>	<b>Mapping and Preparing a Susceptibility Map of Gully Erosion Using the MARS Model . . . . .</b>	<b>405</b>
	Mahdis Amiri and Hamid Reza Pourghasemi	
<b>28</b>	<b>Gully Erosion Susceptibility Assessment Through the SVM Machine Learning Algorithm (SVM-MLA) . . . . .</b>	<b>415</b>
	Hamid Reza Pourghasemi, Amiya Gayen, Sk. Mafizul Haque, and Shibiao Bai	
<b>29</b>	<b>Data Mining Technique (Maximum Entropy Model) for Mapping Gully Erosion Susceptibility in the Gorganrood Watershed, Iran . . . . .</b>	<b>427</b>
	Narges Javidan, Ataollah Kavian, Hamid Reza Pourghasemi, Christian Conocenti, and Zeinab Jafarian	
<b>30</b>	<b>Land Degradation and Community Resilience in Rural Mountain Area of Java, Indonesia . . . . .</b>	<b>449</b>
	Iwan Rudiarto, Isna Rahmawati, and Anang Wahyu Sejati	
<b>31</b>	<b>Spatial Analysis and Prediction of Soil Erosion in a Complex Watershed of Cameron Highlands, Malaysia . . . . .</b>	<b>461</b>
	Taofeeq Sholagberu Abdulkadir, Raza Ul Mustafa Muhammad, Olayinka Gafar Okeola, Wan Yusof Khamaruzaman, Bashir Adelodun, and Saheed Adeniyi Aremu	
	<b>Index . . . . .</b>	<b>479</b>

# Index

- A**  
Afforestation, 13, 18, 160, 236, 241  
Aggradation and degradation theory, 6  
Akarsa watershed, 187–203  
Analytical hierarchy process (AHP), 93–106, 405, 416, 428, 462  
Arc-GIS, 51, 118, 188, 189, 199, 203
- B**  
Badlands, ix, 46, 48, 65, 69, 105, 109–112, 114–116, 118, 122–125, 137, 155, 208, 212, 214, 216, 222, 231  
Bamboo based technology, 307–318  
Bamboo plantation, 13, 308, 310–312, 315–317  
Bed width, 11, 12, 254, 386, 387  
Below ground biomass, 295  
Bio-engineering, 13, 14  
Bivariate analyses, 370, 371, 373, 376, 377, 379, 405  
Buffer strips, 222, 224, 226, 228–230  
Bulk density, 22, 25, 120, 222, 295–297, 308, 327, 360, 386, 387
- C**  
Chambal valley, 3, 6, 12, 307  
Check dams, 14, 15, 17, 158, 160, 238, 248, 292, 310, 313, 322, 337–343, 456  
Chotanagpur plateau, 36, 47, 148, 152  
Cluster analysis, 49, 385, 386, 388–390  
Community resilience, 449–458  
Concentrated flow, 2, 6, 65, 87, 93, 169, 170, 221–230, 235, 295–297, 300, 302, 304, 382  
Cross-section area, 256–258
- D**  
Darcy-Weisbach friction factor, 223, 224, 227, 229, 230  
Dendrogram, 387  
Denudational processes, 70, 79, 134, 198  
Detritus layer, 21, 22, 24, 26, 27, 29  
Disintegration index, 22  
Drainage density, 37, 41, 94, 96, 98, 99, 101, 104, 106, 109, 153, 163, 170, 188, 189, 191–193, 197, 199, 236, 240, 255, 256, 259, 260, 340, 398, 408, 411, 416, 418, 422, 432, 433, 436, 443, 463, 464, 467, 470, 472, 473  
Drainage network, 69, 70, 189, 240, 253, 259, 341, 346, 378, 434
- E**  
Ephemeral channel, 163–183  
Erosion pin, 110, 111, 115, 118–120, 123, 124
- F**  
Factor analysis, 101, 386, 388–390  
Fish resources, 350  
Fourfold plot, 423  
Froude Number (Fr), 223, 227–230, 249
- G**  
Gangani, 22–24, 27, 28, 69, 208, 211, 212, 214, 218, 346, 348–350  
Garbheta badland, 70  
Geo-environmental factors, 134, 137, 144, 187, 188, 203, 415, 435, 443  
Geomorphic threshold, ix, 45–66  
Gorganrood watershed, 427–444  
Groundwater fluctuation, 268–271, 273  
Gully beds erosion, 221–230  
Gully classification, 10, 11, 238  
Gully collapse, ix, 21–32  
Gully head, 6, 7, 10, 12–14, 21, 22, 27, 28, 46, 47, 49, 50, 53, 56, 57, 59, 63, 66, 115, 136, 208, 211, 214, 222, 238, 258, 280, 284, 290, 307–309, 317, 327, 358, 360, 362, 369–379, 381–383, 385–390, 394  
Gully headcut, 14, 51, 63, 66, 142, 208, 372, 386, 394, 399  
Gully morphology, 85, 87, 134, 148, 150, 207–218  
Gully reclamability, 10, 11  
Gully stabilize, 14, 231, 317  
Gully susceptibility, 99, 101, 142–143, 428, 432, 440
- H**  
Hydraulic share stress, 223  
HydroCAD, 331–334  
Hydrogeomorphic, 46, 53, 341
- I**  
Index of diversity, 347  
Initiation of gully, 53, 56, 251–261, 279, 427  
In-situ scouring experiment, 309
- K**  
Kangsabati basin, 164–166, 172, 346, 348–350, 354  
Kappa index, 39, 416, 420, 423, 469, 472–474  
Kernel functions, 419, 467–469, 471–474  
Khoai badland, 147–160
- L**  
Landslides, 40, 57, 133, 134, 238–240, 249, 321, 323, 324, 378, 421, 428, 434, 436, 457, 461, 463  
Lateritic region, 148  
Lateritic tract, 22, 208  
Lateritic uplands, ix, 208

Livelihood improvement, 318  
 Logistic regression (LR), 397, 405, 410, 416, 428, 462

## M

Machine learning, ix, 39–41, 398, 406, 415–423, 428, 429, 431, 434, 443, 462, 467, 469, 474  
 Maharlou watershed, 406–411  
 Mahi ravine, 8, 12  
 Manning roughness coefficient, 223, 224, 230  
 Maximum entropy model (ME), 398, 405, 427–444, 462  
 Micro-watershed, 309, 337–343  
 Multicollinearity, 432  
 Multi-influencing factor (MIF), 187–203  
 Multivariate adaptive regression splines (MARS) model, ix, 405–411, 428

## N

Normalized difference vegetation index (NDVI), 189, 192, 408, 411, 463, 465–467, 469, 470, 472–474

## O

Oceanic upwelling theory, 7  
 Orthophoto, 360, 369, 374

## P

Palaeogenesis, 47  
 Particle size distribution (PSD), 22, 24, 26, 27, 31, 32, 370, 372  
 Pedogeomorphology, 46  
 Photogrammetry, 93, 207–218  
 Pielou's evenness index, 347, 348  
 Potential land degradation zone (PLDZ), 187–203  
 Profilometer, 110, 111, 114–118, 123

## Q

QGIS, 254

## R

Rainfall simulator, 110, 111, 119, 121–122, 325, 332  
 Random forest (RF) model, ix, 35–43  
 Rangamati badland, 222, 231  
 Ravine area restoration, 11, 12  
 R environment, 416, 420  
 Resource conservation, 307–318  
 Reynolds number ( $Re$ ), 223, 226–230  
 River water quality, 345–354  
 Run-off, 2, 39, 46, 69, 98, 118, 140, 147, 163, 199, 222, 235, 252, 280, 296, 307, 322, 337, 345, 358, 369, 382, 393, 408, 416, 433, 462

## S

Sediment yield (SY), ix, 54, 104, 109–111, 118–120, 122, 125, 147, 151, 157, 163–183, 222, 236, 240–242, 248, 279–292, 302, 321, 415  
 Shannon diversity index, 347, 348

Siddheswari river basin, 279–292  
 Silabati river basin, 346, 349, 350, 353, 354  
 Simpson's index, 347  
 Slope aspect, 37, 41, 141, 198, 398, 406, 416, 418, 433, 443  
 Slope instability, 322  
 Soil and Water Assessment Tool (SWAT) model, 238, 240, 279–292, 462  
 Soil anti-scourability, 295, 296, 300, 303–305  
 Soil detachment rate, 296, 300–303  
 Soil erodibility, 55, 112, 166, 190, 191, 194, 197, 199, 281, 283, 295, 296, 300, 301, 354, 370, 450, 463, 465, 470  
 Soil erosion, 2, 21, 35, 45, 69, 93, 109, 133, 148, 163, 188, 211, 222, 236, 251, 279, 295, 307, 321, 337, 345, 357, 378, 381, 393, 405, 415, 427, 450, 461  
 Soil moisture index (SMI), 463, 466, 467, 469, 470, 472, 473  
 Soil organic matter (SOM), 6, 7, 22, 24–27, 29, 31, 32  
 Spatial analysis, 370–372, 461–475  
 Stream length-gradient index, 148, 150  
 Stream power index (SPI), 134, 137, 141, 144, 381, 432, 436  
 Support vector machine (SVM), 406, 415–423, 428, 462, 463, 466–469, 471–474  
 Surface runoff, ix, 14, 46, 53, 55, 105, 147, 151, 163, 168, 222, 228, 280, 281, 283, 284, 287–289, 296, 312, 337, 354, 358, 360, 365, 382, 388, 389, 416, 418, 423, 433, 434, 463  
 Susceptibility map, 35, 36, 41, 133, 145, 405–410, 427–430, 435, 439–441, 443, 462, 463, 466, 469, 471, 472

## T

Tension cracks, 8, 427  
 Terai region, 251–261  
 Topographical factors, 175, 416, 418  
 Top width, 10, 12, 366, 386, 387  
 Tropical plateau, 163–181, 202  
 True skill statistics (TSS), 416, 419, 420, 423  
 Tunneling, 7–9, 358

## U

Univariate, 370, 372, 373, 375, 377, 379  
 Upliftment theory, 6  
 Upstream drainage system, 256

## V

Vegetative cover, 109, 231, 312, 318, 322, 323, 455  
 Vetiver root, 325–328, 331–334  
 Vulnerability, 26, 57, 59, 66, 94, 198, 316, 451, 452, 455–458

## W

Weighted linear combination (WLC), 96, 99, 101, 105  
 Weight of evidence model (WOE), 133, 145, 405  
 Wetness index (WI), 37, 134, 137, 140–142, 144, 381, 398, 416, 418, 422, 433, 436, 443  
 Width-depth ratio, 74, 76, 77, 256, 258, 387

## Y

Yamuna valley, 3, 6, 12, 17, 309, 311, 312, 315