

Wildlife Diversity in the Punjab (Pakistan)

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Abstract: The results of the study indicated that, irrigated forest plantations are rich in wildlife diversity as compared to sub-mountainous tract. Changa Manga Wildlife Sanctuary was highly diversified with 74 wildlife species. In Kundian (WVS) 65 species were identified. In Cheechawalmi (WVS) and Lal Suhanra (NP) 60 and 58 species were observed respectively. Only 35 species were observed in Shorkot (WVS). In sub-mountainous tract, 38 species were observed in Kala Chitta Game Reserve, Attock and 33 in Kathar (GR). Variety of insect species were also noted during the study. Forestry operations, grass-cutting, kusa stubbing and livestock grazing were major threats to wildlife. Forestry operations with the objective of wildlife management will be helpful for the conservation of diversified fauna.

Key words: Irrigated plantation, sub-mountainous tract, National Park, wild life sanctuary, game reserve

Introduction

Irrigated forest plantations provide a potential habitat for a variety of wildlife species. These plantations have been raised clearing the thorn forest. Though relics of natural vegetation typical of tropical thorn forest co-exist with irrigated plantation in the form of groves and patches. However, Sheesham (*Dalbergia sissoo*, Khar *Acacia nilotica*, *Sesha Eucalyptus* spp. and *Populus affinis*) are dominant plant species of irrigated plantations. *Mossambicus Prosopis glandulosa* has naturally invaded in the plantations giving under-storey vegetation cover. In some plantations mulberry *Morus alba* has been planted with sheesham. Shrubs, herbs and grasses provide the ground-cover, giving plantation a multi-storey cover. These different canopy-strata attract a variety of wildlife species according to their preference for different plant species. In sub-mountainous tract, the habitat is scrub vegetation. *Oleophthal* form main canopy cover, with various under growth.

In both types of habitat i.e. irrigated forest plantations and sub-mountainous tract, habitat degradation is a serious problem. Vegetation is exploited as trees are cut to be used as timber and logged for firewood. Understorey shrubs, herbs and grasses are heavily grazed by livestock, destroying breeding sites of ground nesting birds and sub-terrestrial animal species. Such factors have adversely affected populations of wildlife species.

For the protection of wildlife species, the plantations and potential areas in sub-mountainous tract have been declared wildlife sanctuaries (WVS) and Game Reserves (GR) under Punjab Wildlife Act, 1974.

In Pakistan limited work has been carried by some authors, regarding identification of wildlife species. The work is mainly confined to identification of avian species. Chaudhry and Bharti (1988) and Chaudhry et al. (1992), provided a list of avian species of Changa Manga Wildlife Sanctuary. Khan (1987), studied the bird-life of Daphar and Pakhowal Plantation in district Gujrat. Chaudhry and Maan (1997) studied birds diversity in Daphar Wildlife Sanctuary. Chaudhry et al. (1997) studied bird diversity in Gahwala, Game Reserve, Faisalabad. However, overall diversity of plantations as a whole was not studied. So the present study was designed to determine the diversity of wildlife species in irrigated forest plantations and sub-mountainous tract in May-June, 1999. Mammals, birds, reptiles, amphibians and invertebrates including variety of insect species were studied.

Materials and Methods

Diversity of wildlife species was studied by transect method in the following areas.

1. Changa Manga forest plantation (WVS)
2. Daphar and Pakhowal Forest Plantation (WVS)
3. Kundian Forest Plantation (WVS)

4. Lal Suhanra National Park (NP)
5. Bhogal forest plantation (GR)
6. Shorkot forest plantation (WVS)
7. Kamalia plantation (WVS)
8. Cheechawalmi forest plantation (WVS)
9. Kathar, District Rawalpindi (GR)
10. Potential areas for wildlife in District Attock i.e., Kala Chitta, Mahora, Khari Murat and Kala Dauli (GR)

Transects of variable length were studied, recording observations on both sides of the transect. Wildlife species observed physically were noted. Indirect clues for the presence of species were also considered as:

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| i. Calls | Partridges and song birds |
| ii. Nests | Vultures, kites and weaver birds |
| iii. Burrows | Rates, mice, porcupine |
| iv. Faecal pellets | Hare, jackal, fox, jungle cat, nilgai, urial, chinkara and hog deer |
| v. Marks on trees and ground | Wild bear, porcupine |
| vi. Foot-prints | Hare, porcupine, nilgai and deers |

For behavioural study of wildlife species binoculars (7x35) were used. For identification Ali and Riply (1987); Roberts (1991-92) were consulted. Habitat types and threats to wildlife and habitat were identified.

Results and Discussion

The results of the study are given in Table 1.

A. Irrigated Forest Plantation: In Changa Manga plantation endangered mammalian species i.e., Nilgai *Rusa sivalensis*, *Tragocamelus*, Hog deer *Axis porcinus* and Spotted deer *A. Axis* survive were observed. Few common peafowl *Pavo cristatus* also survive under wild conditions. In plantation 14 species of mammals, 50 birds, six reptiles, two amphibians and 23 species of insects were noted. With the help of burrow characteristics and faecal pellets, three main species of rodents viz., Indian mole rat *Reposia indica*, Indian grey *Tatera indica* and Field mouse *Mus musculus* were identified. Areas with *Desmoutia* and grasses were affected with *Nesocia* infestation while other two species were common on the embankments of water courses and barren areas. Jackal, mongoose and jungle cat were among predatory animals. Three hog deer were observed. Droppings of Nilgai indicated that small population of nilgai survive in the plantation. With proper management activities, population of both the endangered ungulate species can be restored. Among birds only residential and summer visitors were recorded. In Daphar plantation, hog deer were released for propagation.

Wildlife Diversity In The Punjab Pakistan

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Wildlife Diversity In The Punjab Pakistan:

Biodiversity, Conservation and Sustainability in Asia Münir Öztürk, Shujaul Mulk Khan, Volkan Altay, Recep Efe, Dilfuza Egamberdieva, Furkat O. Khassanov, 2022-03-10 Of the world's seven continents Asia is the largest. Its physical landscapes, political units and ethnic groups are both wide ranging and many. Southwest South and Middle Asia are highly populated regions which as a whole cover an extremely large area of varied geography. In total this domain is unique in its plant diversity and large vegetation zones with different communities and biomes. It is rich in endemics with specific and intraspecific diversity of fruit trees and medicinal plants including a number of rare high value species. At the same time much of the land in the region is too dry or too rugged with many geographical extremes. Overgrazing, oil and mineral extraction and poaching are the major threats in the area. This two volume project focuses on the dynamic biodiversity of the region with in depth analysis on phytosociology, plants, animals and agroecology. There are also chapters that explore new applications as well as approaches to overcome problems associated with climate change. Much of the research and analysis are presented here for the first time. We believe this work is a valuable resource for professionals and researchers working in the fields of plant diversity and vegetation, animal diversity and animal populations and geo diversity and sustainable land use among others. The first volume guides our readers to West Asia and the Caucasus region while volume two focuses on issues unique to South and Middle Asia. *Environmental Pollution, Biodiversity, and Sustainable Development* Hasnain Nangyal, Muhammad Saleem Khan, 2020-01-28 Environmental Pollution, Biodiversity and Sustainable Development: Issues and Remediation provides an extensive summary of biodiversity. It is the result of the assistance of environmentalists, researchers, policy experts and academicians from across the globe sharing their research and knowledge on biodiversity and ways to mitigate the threat from climate change over utilization of natural resources, pollution and more. The volume considers that biodiversity encompasses a wide range of biological processes ranging from genetic diversity, species, populations, communities and ecosystems to landscapes and regions. This book written by a panel of international experts in biodiversity, conservation biology and evolution from different countries including Iran, Pakistan, India, Bangladesh, Tajikistan, Russia and others highlights the human impact on biodiversity hotspots on a global scale. The volume provides an abundance of valuable research for faculty, students and researchers in environmental sciences, government agencies and many others. **Insights in Veterinary Pharmacology and Toxicology: 2023** Arturo Anadón, 2024-11-28 We are now entering the third decade of the 21st Century and especially in the last years the achievements made by scientists have been exceptional leading to major advancements in the fast growing field of Veterinary Pharmacology and Toxicology. Frontiers has organized a series of Research Topics to highlight the latest advancements in research across the specialty of Veterinary Pharmacology and Toxicology with articles from the members of our accomplished Editorial Boards. This editorial initiative of particular relevance led by Dr Arturo Anadón, Specialty Chief Editor of the Veterinary Pharmacology and Toxicology section is focused

on new insights novel developments new tools for researchers current challenges latest discoveries recent advances and future perspectives in the area of Veterinary Pharmacology and Toxicology Pharmacology and toxicology are translational sciences Pharmacology translates fundamental insights into drug action and fate into clinical therapy Toxicology translates science transferring knowledge from fundamental science into practical applications to safeguard animal health human health and the environment Nowadays veterinary pharmacology and toxicology should be regarded as disciplines contributing to the paradigm One Health reducing risk at the animal human ecosystems interface

Ethnobiology of Mountain Communities in Asia Arshad Mehmood Abbasi, Rainer W. Bussmann, 2021-03-26 Natural resources and associated biological diversity provide the basis of livelihood for human population particularly in the rural areas and mountain regions across the globe Asia is home to the world's highest mountain regions including the Himalayas Karakorum and Hindukush These regions are renowned around the globe because of their unique beauty climate and biocultural diversity Because of geoclimatic conditions the mountains of Asia are medicinal and food plant diversity hot spots The indigenous communities residing in the valleys of these mountains have their own culture and traditions and have a long history of interaction with the surrounding plant diversity Local inhabitants of these mountains areas possess significant traditional knowledge of plant species used as food medicine and for cultural purposes So far many workers have reported traditional uses of plant species from different regions of Asia including some mountain areas however there is not one inclusive document on the ethnobotany of mountains in Asia This book provides a comprehensive overview on ethno ecological knowledge and cross cultural variation in the application of plant species among various communities residing in the mountains of Asia cross cultural variation in traditional uses of plant species by the mountain communities high value medicinal and food plant species and threats and conservation status of plant species and traditional knowledge This book should be useful to researchers of biodiversity and conservation ethnobiologists ethnoecologists naturalists phytochemists pharmacists policy makers and all who have a devotion to nature

Exploring Traditional Wild Edible Plants Vibhor Agarwal, Sachidanand Singh, Rahul Datta, 2025-02-11 Wild edible plants are native species that grow and reproduce naturally in their natural habitats without domestication These plants can serve as a healthier alternative to farmed crops that may be heavily laden with pesticides and other poisonous substances This book focuses on assessment of the nutritional value potential health benefits and mechanisms of action of various wild edible plants It presents information on nutrients and bioactive ingredients that can have health advantages including antioxidant properties antimicrobial anti inflammatory and antidiabetic effects Features Comprehensive exploration of potential benefits as well as side effects of wild edible plants Special emphasis is placed on diversity category and pharmacological values of wild edible plants Discusses challenges regarding the usage of wild edible plants such as overharvesting and habitat destruction safety and toxicity A volume in the Exploring Medicinal Plants series this book highlights bioactive compounds and therapeutic efficacies of various wild edible plant species It is

useful reading for scientists researchers academia and plant scientists interested in the health benefits of wild edible plants

THE SECOND REPORT ON THE STATE OF THE WORLD'S ANIMAL GENETIC RESOURCES FOR FOOD AND AGRICULTURE Food and Agriculture Organization of the United Nations, 2018-06-06 Animal genetic resource diversity underpins the supply livestock products and services across a wide range of production environments It promotes resilience and serves as a basis for adapting livestock management to changing conditions It is vital to livelihoods of many of the world's poor people It can contribute to the delivery of ecosystem services such as landscape management and the maintenance of wildlife habitats However it is often undervalued underused and under threat This report updates the global assessment provided in the first report on The State of the World's Animal Genetic Resources for Food and Agriculture published in 2007 It focuses particularly on changes that have occurred during the period since the first report was published It serves as a basis for a review and potential update of the Global Plan of Action for Animal Genetic Resources which since 2007 has provided an agreed international framework for the management of livestock biodiversity Drawing on 129 country reports it presents an analysis of the state of livestock diversity the influence of livestock sector trends on the management of animal genetic resources the state of capacity to manage animal genetic resources including legal and policy frameworks and the state of the art in tools and methods for characterization valuation use development and conservation **Biodiversity of Pakistan** Shahzad Ahmad Mufti, Charles Arthur Woods, Syed Azhar Hasan, 1997 *Valuation and Sustainable Management of Crop and Livestock Biodiversity: A Review of Applied Economics Literature*, *The Food Security, Biodiversity, and Climate Nexus* Mohamed Behnassi, Himangana Gupta, Mirza Barjees Baig, Ijaz Rasool Noorka, 2022-10-20 This volume is the outcome of an international cooperation between 73 scientists experts and practitioners from many countries disciplines and professional areas As a part of a series of CERES publications the volume attempts to contribute to the scientific debate about the food biodiversity climate nexus by developing a comprehensive region specific and broader global understanding of the linkages between these areas especially in the context of Global South Instead of providing only modern science based solutions for the nexus related challenges the volume covers case studies that present mixed solutions offering the use of traditional ecological knowledge in combination with modern science for both resilience and sustainability This is increasingly instrumental in shaping the needed response options regarding the economic social and environmental future of the world Based on a multi regional and cross sectoral analysis the approach consists of assessing the different natural and anthropogenic factors currently affecting ecosystems and their services especially the impacts of climate change highlighting the different linkages between the state of biodiversity and food systems in many contexts and scales and exploring the various response mechanisms to effectively manage the implications of such linkages Most chapters provide inputs for future relevant research and policy agendas A preliminary survey of spider fauna of Malakwal Maryam Sameem, Harnessing NanoOmics and Nanozymes for Sustainable Agriculture Rajput, Vishnu D., Singh, Abhishek, Ghazaryan, Karen, Alexiou,

Athanasios,Said Al-Tawaha, Abdel Rahman Mohammad,2024-05-01 In an era overshadowed by pressing global challenges such as climate change burgeoning populations and the depletion of natural resources the agricultural landscape is at a critical juncture The need for sustainable practices has never been more urgent with conventional methods struggling to meet the demands of a growing population while grappling with environmental degradation Harnessing NanoOmics and Nanozymes for Sustainable Agriculture delves into the heart of the problem navigating the intricate web of challenges facing agriculture today From dwindling crop yields to the environmental repercussions of conventional farming practices the urgency to find innovative sustainable solutions is paramount Harnessing NanoOmics and Nanozymes for Sustainable Agriculture offers a comprehensive exploration of nanotechnology s potential to revolutionize agriculture presenting a promising pathway toward enhanced productivity minimizing environmental impact and optimal resource utilization *Wild Edibles of Deserts* Salman Majeed,Muhammad Zafar,Mushtaq Ahmad,Mohd Kafeel Ahmad Ansari,Andrea Pieroni,Shazia Sultana,2025-07-01 Global Wild Edibles of Deserts Food Security and Sustainability provides coverage of topics in food and health in desert rangelands using an interdisciplinary approach that considers health not only in a functional and human sense but also in terms of external factors including aridity The plant diversity in desert ecosystems provide economic service benefits such as sources of fodder fuel wood and traditional medicinal plants This book documents wild edibles commonly grown in deserts that are hugely beneficial for the herbal industry for the socio economic uplift of local communities This book contains multiple field pictorial graphs of desert wild edible plants to help with their identification and it gives detailed information on food security issues and sustainability measures in the world desert zones It also focusses on the diversity of wild edibles in deserts across the globe their nutraceutical importance production consumption trends integration into food menus and marketing and livelihood opportunities to the indigenous people A volume in the Exploring Medicinal Plants series this book creates opportunity for policymakers to develop plans for the successful entry of wild edibles into herbal industries and attracts farmers owning infertile lands to cultivate wild edibles in desert rangeland The book is a valuable resource for researchers conservationists and policymakers seeking solutions at the intersection of food security and environmental sustainability Vegetation Types of the Dieng Mountains and Their Influences on Bird and Mammalian Communities Siti Nurleily Marlina,2013-01-21 Kurzbeschreibung Der Druck des Bevölkerungswachstums auf der indonesischen Insel Java hat zu gravierender Entwaldung und Schädigung von Wäldern geführt so dass nur noch 8,2 Prozent der ursprünglichen Waldfläche in den Jahren 2006/2007 vorhanden waren Der Bevölkerungsdruck lie Javas Waldflächen durch Landumwandlung in Siedlungen und weiter schrumpfen und kleine isolierte Waldstücke an Berggipfeln wie die in den Dieng Mountains übrig Das in der Provinz Zentral Java gelegene Dieng Mountains Ökosystem spielt eine wichtige Rolle bei der Bereitstellung einer breiten Palette von Waren und Dienstleistungen insbesondere bei der Versorgung angrenzender Gebiete mit Süßwasser und beim Erhalt der biologischen Vielfalt Allerdings leiden auch die Bergwälder in den Dieng Mountains in Folge des Bevölkerungsdrucks

lkerungsdrucks unter Abholzung Schlechte landwirtschaftliche Anbaumethoden haben zum Auftreten von Pestizidbelastungen zu einem hohen Ma an Erosion Sedimentationen von Seen und Stauseen Erdrutschen Schlammlawinen und berschwemmungen gef hrt Waldbr nde und illegaler Holzeinschlag gefolgt von Landbeanspruchung und Wanderfeldbau f hrten dazu dass reife Bergw lder durch junge Sekund rvegetation ersetzt wurden Wiederbewaldungen sind zu einem bedeutenden Vegetationstyp rund um das Dieng Plateau geworden und angesichts der gegenw rtigen landwirtschaftlichen Anbaumethoden zeigt der Trend ihres Fl chenausma es dass sie auch in Zukunft fortbestehen werden Bisher hat man sich wenig mit den Wiederbewaldungen in den Dieng Mountains besch ftigt ihr Wert in Bezug auf die Funktionsweise von kosystemen und den Erhalt der biologische Vielfalt wurde nur unzureichend untersucht Da Bergw lder der Dieng Mountains da f r bekannt sind viele endemische und seltene Tier und Pflanzenarten zu beherbergen ist es wichtig zu verstehen wie Tier und Pflanzenarten in diesem Gebiet den Habitatwandel bew ltigen Die vorliegende Forschungsarbeit ist ein Versuch Auswirkungen von Landnutzungs nderungen die durch anthropogene St rungen hervorgerufen wurden auf die lokale Flora und Fauna speziell auf Vogel und S ugetiergemeinschaften zu untersuchen Die Ergebnisse dieser Studie sollen einen berblick ber den gegenw rtigen Zustand des Dieng Mountains kosystems geben und dazu beitragen Informationsl cken fr herer Studien zu schlie en Diese Untersuchung soll zust ndigen Politikern Wissen ber den aktuellen Stand der Dieng Mountains bieten Sie soll ihnen erm glichen ein wirksames Programm mit angemessenen Zielen zu entwickeln und geeignete Ma nahmen zu ergreifen um die kologischen Bedingungen der Dieng Mountains zu verbessern Unsere Ergebnisse zeigen dass die Entwicklung der Sekund rvegetation der Dieng Mountains stark von der Geschichte ihrer Landnutzung und von den Aufforstungsprogrammen der lokalen Regierung beeinflusst wurde Die Vegetationsstruktur der W lder und des Buschlandes der Dieng Mountains waren einander hnlich Sie kennzeichnete die typische einfache Struktur mit einem offenen Kronendach und dichtem Unterholz die in der Regel in einem tropischen Sekund rwald vorgefunden wird Auf Gr nland kamen wenige B ume vor kein Anzeichen der Einwanderung von B umen wurde in diesem Lebensraum gefunden trotz seiner unmittelbaren N he zu nat rlichen Waldst cken Die relativ niedrigen Anteile von Baumverj ngungen in allen Lebensr umen k nnen den in diesen gro en H hen rauen Umgebungsbedingungen den Auswirkungen von Kahlschl gen in der Vergangenheit sowie der Konkurrenz von Kr utern zugeschrieben werden Der Einfluss menschlicher Aktivit ten in diesen Lebensr umen kann auch ein wichtiger Faktor sein der die Erholung der Vegetation verlangsamt Die Auswirkungen der Aufforstungen auf die Gestaltung der Zusammensetzung der Sekund rvegetation zeigten sich in der Dominanz der Baumarten die im Laufe des Programms gepflanzt worden waren die nicht einheimischen Arten *Acacia decurrens* und *Cupressus sempervirens* und die indonesische Bergart *Schima wallichii* Der Pionierstrauch *Melastoma affine* die Gr ser *Imperata cylindrica* und *Isachne globosa* sowie die Ruderalarten *Eupatorium odoratum* *Eupatorium riparium* *Buddleja asiatica* und *Rubus rosaefolius* dominierten die Unterholzvegetation Insbesondere auf Gr nland schien die Dominanz des kleinen Farns *Gleichenia dichotoma* das Wachstum

der vorkommenden Grasarten zu unterdrücken was zur Dominanz einer Krautart der *Conyza javanica* bei Pioniergrasarten führte. Naturveränderungen einheimischer indonesischer Baumarten wurden in einer relativ kleinen Zahl vorgefunden. Verglichen mit ähnlichen Studien in anderen Sekundärwäldern wurde in den Dieng Mountains ein wesentlich geringerer Reichtum an Pflanzenarten vor allem an Gehölzarten festgestellt. Der Beitrag der Strauch- und Krautkategorien mit mehr als 80 Prozent an der gesamten botanischen Artenvielfalt zeigt den Mangel an Baumarten in unserem Forschungsgebiet an. Generell waren der Reichtum und die Diversität an Pflanzenarten im Buschland am höchsten. Der niedrigste Pflanzenartenreichtum wurde im Wald gefunden, während die geringste Diversität an Pflanzenarten auf Grnland verzeichnet wurde. Diese Ergebnisse können mit dem Grad von Störungen in jedem Lebensraumtyp zusammenhängen, wobei Buschland auf einem mittleren Niveau liegt. Die Ähnlichkeit der Zusammensetzung der Pflanzenarten war zwischen den Habitaten in jeder Kategorie sehr hoch. Dies deutet trotz des Altersunterschiedes zwischen beiden Lebensräumen darauf hin, dass Wald und Buschland noch in einem vergleichbaren Sukzessionsstadium waren, während sich Grnland wohl nicht zu Wald entwickeln wird. Wegen der anhaltenden Bevölkerungsausbreitung in den Dieng Mountains dürfte das Schicksal der sekundären Vegetation dieses Gebietes von dem Ausmaß zukünftiger Störungen durch den Menschen bestimmt werden. Vogel wurden in den verschiedenen Lebensräumen der Dieng Mountains in relativ geringen Dichten gefunden. Nach früheren Studien anderer Autoren sind niedrige Vogeldichten häufig in einer tropischen Landschaft in der landwirtschaftliche Flächen und Flächen sekundärer Vegetation gemischt in mosaikartiger Verteilung vorliegen. Wald hatte von allen Lebensraumtypen die komplexeste Vegetationsstruktur und er wies die höchste Dichte und die größte Artenvielfalt von Vögeln auf. Da Vogelabundanzen durch die Lebensraumtypen in ihrer Umgebung beeinflusst werden können, die Nähe der Waldstücke zu den Urwaldresten auf den Berggipfeln positive Auswirkungen auf die Vogelpopulationen im Wald gehabt haben. Mit einer ähnlichen, aber weniger komplexen Vegetationsstruktur und Zusammensetzung als Wald wies das Buschland ein mittleres Niveau der Dichte und der Artendiversität der Avifauna auf. Trotz seines Mangels an mosaikartiger Heterogenität und des Vorhandenseins von nur einer kleinen Anzahl Bäume zwischen den Flurstücken hatten landwirtschaftliche Flächen die zweithöchste Vogeldichte. Mögliche Ursachen hierfür sind die Nähe von landwirtschaftlichen Flächen zu städtischen Gebieten und zu Buschland mit seinen Randstrukturen. Holziger Gewächse. Diese Faktoren sind dafür bekannt, positive Auswirkungen auf die Abundanz und Artendiversität von Vögeln zu haben. Grnland wies die geringste Artenzahl, Artendiversität und Vogeldichte auf. Die gesamte Anzahl der Vogelarten in unserem Untersuchungsgebiet war gering im Vergleich zur Anzahl Vogelarten einer früheren Studie, die auch in den Dieng Mountains durchgeführt worden war. Allerdings war die Vogelwelt in unserer Untersuchung sehr heterogen, so dass es wahrscheinlich ist, dass die tatsächliche Artenzahl deutlich höher als die erfasste war. Die meisten der erfassten Vogelarten haben eine niedrige bis mittlere Abhängigkeit von Wald und können ihre Ansprüche in einer breiten Palette von Lebensräumen decken. Es wurden nur sechs Vogelarten erfasst, die vom Wald abhängig sind. Unsere Ergebnisse

deuten darauf hin dass das Dieng Mountains kosystem in seinem gegenwärtigen Zustand die Lebensraumansprüche von Populationen verschiedener Vogelarten decken kann Das beruht vor allem auf dem Vorhandensein von Sekundärvegetation die als Ersatzhabitat für waldbahnige Arten fungiert Allerdings wird das Fortdauern dieses Zustandes hauptsächlich von der zukünftigen Ausweitung der Landwirtschaft abhängen Eine Ausweitung der Agrarlandschaft wird letztendlich die Abundanz und die Vielfalt von Vögeln in den Dieng Mountains verringern Lässt man es zu dass sich die Sekundärvegetation zu einer Klimaxgesellschaft entwickelt so wird die Abundanz und Artenvielfalt von Vögeln zunehmen hnlich positive Wirkungen kann nach unserer Einschätzung zukünftig die bislang im Untersuchungsgebiet noch nicht praktizierte Agroforstwirtschaft entfalten Letztendlich muss der Zustand des Dieng Mountains kosystems verbessert werden um seine Eignung als Lebensraum für seine einheimische Vogelwelt sicher zu stellen Dreizehn kleine bis mittelgroße Säugetierarten wurden in unserem Untersuchungsgebiet mittels direkter Bestandsaufnahmen und Interviews erfasst Zwei Arten der schwarze Haubenlangur *Trachypithecus auratus* und der Java Leopard *Panthera pardus melas* wurden in der Roten Liste der IUCN als gefährdet bzw vom Aussterben bedroht eingestuft Unsere Ergebnisse deuten darauf hin dass die Sekundärvegetation der Dieng Mountains noch einen geeigneten Lebensraum für die Säugetiergemeinschaft aufwies wobei im Wald und im Buschland jeweils ein viel höherer Artenreichtum herrschte als auf Grnland Der Artenreichtum an Säugetieren war auf Ackerland fast so hoch wie im Wald und im Buschland was bedeutet dass die landwirtschaftlichen Flächen mit ihren angebauten Kulturen Nahrungshabitate für die meisten Säugetierarten in den Dieng Mountains bot Die Mehrheit der aufgeführten Arten waren Lebensraumgeneralisten und fähig sich an gestörte Umgebungen anzupassen Hiervon sind zwei Primatenarten ausgenommen der Javaneraffe *Macaca fascicularis* und der schwarze Haubenlangur *Trachypithecus auratus* deren Lebensraum nur auf Wald beschränkt war Die Ergebnisse der Habitatpräferenzanalysen von vier Arten die direkt erfasst worden waren waren bei drei Arten mangels ausreichender Daten wenig aussagekräftig Das Wildschwein *Sus scrofa* zeigte eine signifikante Präferenz für Wald und Wiesen es mied Buschland bei der Nahrungssuche Die Mitglieder der Säugetiergemeinschaft spielen anscheinend eine wichtige Rolle als Samenverbreiter bei der Erholung der Wälder der Dieng Mountains und wir erhoffen uns dass diese Studie als Grundlage für die Schaffung eines wirksamen Naturschutzplans zur Verbesserung des Dieng Mountains kosystems dient Betrachtet man den Trend der menschlichen Bevölkerungsexpansion und die Landnutzungsmuster in den Dieng Mountains mag das Schicksal der Wälder und der Tierwelt in diesem Gebiet vor allem durch die Höhe zukünftiger Störungen durch Menschen bestimmt werden Günstigenfalls kann sich eine wechselseitige Beziehung zwischen Wald und den Menschen die ihn nutzen entwickeln was ein nachhaltiges Management von Wald und Landschaft zur Folge haben könnte Weitere Forschung ist notwendig um die Folgen der landwirtschaftlichen Praktiken in den Dieng Mountains einschließlich der Auswirkungen von Pestiziden und Düngemitteln auf die Wildbestände zu untersuchen

Description The pressure from population growth in Indonesia's Java Island has resulted in grave deforestation and forest degradation leaving only 8 2

percent of forest cover remaining in 2006 2007 Population pressure continued to shrink Java's forest cover through land conversion into settlement areas and agricultural fields leaving small isolated forest patches situated on mountain tops like the ones found in the Dieng Mountains Located in Central Java Province Indonesia the Dieng Mountains ecosystem has an important role in providing a wide range of goods and services especially in supplying freshwater to its adjacent areas and maintaining biodiversity However the montane forests in the Dieng Mountains suffer from degradation caused by population pressure Poor farming practices have resulted in the occurrence of pesticide pollution a high level of erosion soil sedimentation in lakes and reservoirs landslides and mud floods Forest fires illegal logging forest looting followed by land encroachment and shifting cultivation have replaced the mature montane forests with young secondary vegetation Regrowth forests have become the major vegetation type surrounding the Dieng Plateau and with current farming practices the trend of their formation indicates that they will persist into the future So far little has been done to deal with regrowth forests in the Dieng Mountains and their value in terms of ecosystem functioning and biodiversity preservation has been insufficiently studied Since the Dieng montane forests are known to harbor many endemic and rare wildlife species it is important to understand how wildlife species in this area cope with habitat change This research is an attempt to examine the impact of land use change resulting from human-induced disturbances to the local flora and fauna specifically to bird and mammal communities The results of this research will provide an overview of the present condition of the Dieng Mountains ecosystem and help to fill in the information gaps left by previous studies This research will provide policymakers with knowledge of the current state of the Dieng Mountains allowing them to develop an effective program with reasonable goals and take appropriate actions in their effort to improve the ecological conditions of the Dieng Mountains Vegetation data were collected in habitats that represent various ages of second growth vegetation namely woodland shrubland and grassland A stratified systematic sampling with a random start was used to collect data on various growthforms of plant species Vegetation parameters i.e. species density dominance diameter class distribution were then calculated Plant species richness and diversity and stands similarity were analyzed using SPADE The bird census was carried out in the same locations chosen for vegetation surveys using the point transect distance method with additional data collections in agricultural land The results were then analyzed using the programs DISTANCE 6.0 release 2 for estimating the bird densities and SPADE for estimating bird species richness and diversity Surveys of mammal signs were also carried out in the same locations chosen for vegetation surveys and bird censuses by using a strip transect of 2 m width crisscrossing the habitats in a random direction Mammal species richness and the habitat preference of each species were then analyzed In addition interviews with local people were also conducted to gather supplementary information regarding the mammalian community in the Dieng Mountains Our results show that the development of the secondary vegetation of the Dieng Mountains was highly influenced by its land use history and reforestation programs run by the local government The vegetation structure of woodland and

shrubland of the Dieng Mountains were similar characterized with the typical simple structure normally found in a tropical secondary forest an open canopy and dense undergrowth Few trees populated the grassland no sign of tree invasion was found in this habitat despite its close proximity to natural forest patches The relatively low tree regenerations in all the habitats may be attributed to harsh environmental conditions caused by the high altitudinal location and the impact of forest clearings in the past as well as competition with herbs The effect of human activities in those habitats may also be an important factor slowing down the vegetation recovery The impact of reforestations in shaping the floristic composition of the secondary vegetation was seen in the domination of tree species planted during the course of the program the non native species *Acacia decurrens* and *Cupressus sempervirens* and Indonesian mountain species *Schima wallichii* Pioneer shrub species *Melastoma affine* and grass *Imperata cylindrica* and *Isachne globosa* as well as ruderal species *Eupatorium odoratum* *Eupatorium riparium* *Buddleja asiatica* and *Rubus rosaefolius* dominated the undergrowth vegetation Specifically in grassland the small fern *Gleichenia dichotoma* s domination seemed to suppress the growth of coexisting grass species leading to the domination of a herb species *Conyza javanica* over pioneer grass species Native Indonesian tree species were discovered as natural regrowth in a relatively small number Compared with similar studies in other secondary forests the richness of plant species found in the Dieng Mountains was considerably lower especially that of woody plants The contribution of the shrub and herb categories to more than 80 percent of the total species richness indicates the scarcity of tree species in our research area In general plant species richness and diversity were found highest in shrubland The lowest species richness was found in woodland while the lowest plant species diversity was recorded in grassland These results may be related to the level of disturbance in each habitat which shrubland experienced at an intermediate level The similarity of plant species composition among habitats in each category was very high This suggests that woodland and shrubland were still in a comparable stage of succession despite the age difference between both habitats while grassland may not succeed in developing into a forest Considering the trend of population expansion in the Dieng Mountains the fate of the secondary vegetation in this area may be determined by the level of future interference by humans In various habitats in the Dieng Mountains birds were found in relatively low densities Based on previous studies by other authors the occurrence of birds in low densities is common in a tropical landscape in which farmland and secondary vegetation are mixed into mosaics The woodland of the Dieng Mountains which had the most complex vegetation structure compared with the other habitat types bore the highest bird density and species diversity As bird assemblages are influenced by their surrounding habitat types the bird populations in woodland may have been positively affected by woodland s proximity to the patches of remnant forests on the mountain tops With a similar yet less complex vegetation structure and composition than woodland shrubland had an intermediate level of bird density and species diversity Despite its lack of mosaic heterogeneity and the presence of only a small number of trees between plots agricultural land placed second in bird density Possible causes for this include the

proximity of agricultural land to urban areas and its adjacency to shrubland which provided woody edge habitat these factors are known to have positive effects on bird abundance and diversity Grassland had the lowest species richness species diversity and bird density The overall bird species diversity in our study area was low compared with the number of bird species listed in a previous study that also took place in the Dieng Mountains in 2001 However the bird community was highly heterogeneous making it likely that the actual species richness was considerably higher than the observed one Most of the bird species encountered have a low to medium dependency on forest and a broad range of habitat suitability only six forest dependent species were recorded Our results suggest that in its current state the Dieng Mountains ecosystem can still meet the needs of various bird species populations This is mainly because of the presence of secondary vegetation which functions as a substitute habitat for forest dependent species However the persistence of this condition will depend mainly on future agricultural expansion An expanding agricultural landscape will eventually reduce the abundance and diversity of birds in the Dieng Mountains Allowing the secondary vegetation to develop into a climax community will increase avian abundance and species diversity Agroforestry not yet widely practiced in the study area also has the potential to have similar positive effects on the avifauna Nevertheless the condition of the Dieng Mountains ecosystem still needs to be improved to assure its suitability as a habitat for its native avifauna Thirteen small to medium sized mammal species were recorded in our study area through direct surveys and interviews Two species the Javan langur *Trachypithecus auratus* and Javan leopard *Panthera pardus melas* were categorized as vulnerable and critically endangered respectively under the IUCN Red List Our results suggest that the second growth vegetation of the Dieng Mountains still provided a suitable habitat for the mammalian community with woodland and shrubland each supporting much higher species richness than grassland The species richness observed in agricultural land was almost as high as that of woodland and shrubland implying that agricultural land with its cultivated crops provided food and habitat for most mammal species in the Dieng Mountains The majority of species listed were habitat generalists and capable of adapting to disturbed environments except for two primate species the long tailed macaque *Macaca fascicularis* and Javan langur whose habitat was confined only to woodland The results of habitat preference analyses of mammal species recorded directly in the field were mostly inconclusive owing to the lack of sufficient data The most meaningful result was with the wild boar *Sus scrofa* which showed a significant preference towards woodland and grassland while avoiding shrubland for foraging With their function as seed dispersers the mammalian community's members play important roles in the Dieng Mountains forest recovery and therefore we expect this study to serve as a basis for establishing an effective conservation plan towards the improvement of the Dieng Mountains ecosystem Considering the trend of human population expansion and land use patterns in the Dieng Mountains the fate of forests and wildlife in this area may mostly be determined by the level of future interference by humans At best a mutual relationship can develop between the forest and humans utilizing it which would give rise to sustainable forest and landscape management Further

research is needed to study the consequences of agricultural practices in the Dieng Mountains including the effects of pesticides and fertilizers on wildlife populations **Coastal Mangrove Herpetofauna** Jayanta Kumar Mallick,2025-08-07 This book contains well researched and experience derived information on herpetofauna Amphibia and Reptilia species including diversity composition and site specific distribution from the world s largest mangrove ecosystem the Indian Sundarban Biosphere Reserve SBR and Bangladesh Sundarban Reserve Forest SRF including the ecological hinterlands The loss and degradation of habitats has caused faunal species extinction and population decline The analyses of the field survey data collected in the transboundary Sundarbans during the 21st century revealed a comparatively richer species diversity including new discoveries due to remarkable habitat heterogeneity and ecological adaptations of the herpetofauna In total 160 species under 79 genera and 27 families of Herpetofauna Amphibia 32 under 15 genera and six families and Reptilia 128 under 64 genera and 21 families are so far recorded in the Greater Sundarbans These transitional zones offer a mosaic of habitats and food resources supporting a wider range of species than either adjacent ecosystem alone This is the first book to highlight the herpetofauna ecology of the present transboundary Sundarbans and reclaimed areas It will be an ideal resource for researchers and postgraduate and graduate students in zoology botany ecology and conservation It is an important reference source for environmentalists conservationists resource managers planners government agencies academic institutions NGOs and naturalists Sustainable Agriculture Vishnu D. Rajput,Abhishek Singh,Karen Ghazaryan,Tatiana M. Minkina,Abdel Rahman M. Al-Tawaha,2024-11-18 The agricultural food system needs to provide access to enough healthy and affordable food for the growing population and mitigate its impact on the planet for future generations Emerging technologies can help farmers increase yields The book presents theoretical and applied aspects of nanotechnology and biotechnology It also includes topics on management and food security Nanobiosensors for Crop Monitoring and Precision Agriculture Jen-Tsung Chen,2025-07-29 Nanobiotechnology has been intensively investigated for decades and is thus well recognized as a promising approach for advancing sustainable agriculture particularly proving precision and smart tools based on engineered nanoparticles nanomaterials Among them nanosensors and nanobiosensors have the potential to revolutionize agricultural practices by sensing detecting and monitoring cellular processes such as signal transduction and plant hormone dynamics crop performances and soil environmental conditions for precision and even real time management of fertilizers pesticides plant growth yield quality stress responses and post harvest processes In the international book market there is a gap in providing an updated comprehensive book resource for readers who are interested in materials science and nano biotechnology particularly the detailed part of nano biosensors for agri food applications Therefore this book bridges the knowledge gap by providing a complete guide to nano biosensors from their fundamentals to current agricultural applications which presents a series of review type chapters organized by diverse experts This book consists of 14 chapters including subtopics such as optical nanobiosensors calorimetric nanobiosensors immuno nanobiosensors

enzymatic nanobiosensors and apta nanobiosensors for their synthesis action and applications This book provides an updated overview of ethical considerations and regulations for nanotechnology in agri food applications **Large Language**

Models for Sustainable Urban Development Nitin Liladhar Rane, Suraj Kumar Mallick, Jayesh Rane, Chaitanya Baliram Pande, 2025-07-01 With rapid urbanization defining the 21st Century cities face mounting challenges in achieving sustainability equity and functionality This book explores how innovative technologies such as Artificial Intelligence AI and Large Language Models LLMs can transform urban development by offering intelligent data driven solutions LLMs go beyond automation acting as co creators in addressing environmental sustainability resource management and equitable development By analyzing regulations best practices and real time data on phenomena such as air pollution and traffic these models empower urban planners to design smarter more sustainable cities while fostering collaboration across disciplines Divided into five sections the book explores the diverse applications of LLMs from optimizing renewable energy systems and enhancing urban planning to revolutionizing construction practices and improving resource efficiency It highlights case studies on integrating AI with smart infrastructure ecological balance and disaster resilience While underscoring their transformative potential the book also examines ethical considerations such as bias privacy and environmental impact More than a collection of research this work is a call to action for urban planners data scientists policymakers and researchers to harness AI responsibly in building greener more equitable urban futures *Multidimensional Outlook on Environment*

Sarmistha Saha, Nobina Mukherjee, Rahi Soren, Sirsendu Bhowmick, 2021-04-30 This book *Multidimensional Outlook on Environment* is a humble endeavour by Green Feather to understand and review the impact of human behaviour on environment At Green Feather we are passionate about nature ecology and the environmental challenges that we face in the 21st century Considering the present dire situation Environment can no longer be taken for granted and it is imperative for us to provide conscious efforts towards its restoration Through this book our effort is to collate some important research studies and shed light on diverse environmental topics of importance The topics covered in the book present a collage of various knowledge outlooks dedicated to the multidisciplinary domain of Environment The chapters discuss some important and niche topics on environment that concerns us in today's world **Microbial Data Intelligence and Computational**

Techniques for Sustainable Computing Aditya Khamparia, Babita Pandey, Devendra Kumar Pandey, Deepak Gupta, 2024-02-29 This book offers information on intelligent and computational techniques for microbial data associated with plant microbes human microbes etc The main focus of this book is to provide an insight on building smart sustainable solutions for microbial technology using intelligent computational techniques Microbes are ubiquitous in nature and their interactions among each other are important for colonizing diverse habitats The core idea of sustainable computing is to deploy algorithms models policies and protocols to improve energy efficiency and management of resources enhancing ecological balance biological sustenance and other services on societal contexts Chapters in this book explore the

conventional methods as well as the most recently recognized high throughput technologies which are important for productive agroecosystems to feed the growing global population This book is of interest to teachers researchers microbiologist computer bioinformatics scientists plant and environmental scientist and those interested in environment stewardship around the world The book also serves as an advanced textbook material for undergraduate and graduate students of computer science biomedicine agriculture human science forestry ecology soil science and environmental sciences and policy makers *Artificial Intelligence in Microbial Research* Babita Pandey,Devendra Pandey,Aditya Khamparia,Venkatesh Dutta,Valentina E. Balas,2025-05-21 This book explores the convergence of microbiology and artificial intelligence AI and delves into the intricate world of microbial systems enhanced by cutting edge AI technologies The book begins by establishing a foundation in the fundamentals of microbial ecosystems and AI principles It elucidates the integration of AI in microbial genomics demonstrating how advanced algorithms analyze genomic data and contribute to genetic engineering Bioinformatics and computational microbiology are explored showcasing AI s role in predictive modeling and computational tools The intersection of AI and microbial applications extends to drug discovery precision agriculture and pathogen detection Readers gain insights into AI driven drug development the optimization of agricultural practices using microbial biostimulants and early warning systems for crop diseases The book highlights AI s role in microbial biotechnology elucidating its impact on bioprocessing fermentation and other biotechnological applications Climate smart agriculture and microbial adaptations to environmental challenges are discussed emphasizing sustainable practices This book caters to a diverse audience including teachers researchers microbiologist computer bioinformaticians plant and environmental scientists The book serves as additional reading material for undergraduate and graduate students of computer science biomedical agriculture human science forestry ecology soil science and environmental sciences and policy makers to be a useful to read

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