1. PERSONAL:

Dr. ANAND NARAIN SINGH
Assistant Professor
Department of Botany,
Panjab University Chandigarh
Sector-14
Chandigarh (UT) -160014, INDIA
Tel.: +91-172-2534008 (Office); Cell: +91-09888703865; Fax: +91-172-2779510
Email: dranand1212@gmail.com; dranand1267@yahoo.co.in; ansingh@pu.ac.in

Date of birth and nationality: 03 April, 1970; Indian

2. ACADEMIC:

A. Fields of Interest:

(a) Research:-

a) Ecological Restoration of degraded land/ecosystems
b) Soil carbon sequestration; restoration and redevelopment of damaged/disturbed soil ecosystems; mechanism of soil biological fertility in damaged or spoiled ecosystems.
c) Impact of climate change on biotic (plant community, biodiversity) and abiotic factors (rainfall, soil moisture gradient in soil and precipitation pattern) in contrasting ecosystems.
d) Plant phenological behaviour, functional traits and their ecological plasticity with respect to stress of changing environment.
e) Ecology of Sustainable Development and Conservation Biology of natural/artificial ecosystems.
f) Phytoremediation of contaminated soil and aquatic ecosystems by heavy metals, pesticides and other organic/inorganic contaminants; Ecology, pattern, process, mechanism and evaluation of suitable indigenous plant species for remediation under different phytoremediation technologies.
g) Ecology of invasive plant species with respect to functional traits, nutrient cycling and soil carbon sequestration of invaded ecosystems.
h) Forest Ecology and Management; Forestry engineering; biodiversity reconstruction; community dynamics in natural and reconstructed ecosystems.
i) Ecosystem functioning and Plant diversity mechanism.
j) Soil seed banks of invasive plant species and their dispersal mechanism in contrasting invaded/non-ecosystems.
k) Ecology of soil ecosystems in dry lands; deserts and desertification.
l) Combating desertification
m) Ecological Restoration of dry/arid/semi arid lands and desert ecosystems; ecology of nutrient and water use efficiency of desert adapted plants and their role in combating desertification and raising biological fertility of soil.
n) Ecology of soil biota, their role in maintaining soil fertility, mineralization of organic matters; linkages and integration between above and below ground ecosystems.
o) Searching certain key ecological indicators for ecosystem performance traits, soil biological fertility index and ecosystem health indices.
p) Ecological engineering of damaged ecosystems by natural and anthropogenic disturbances e.g. land sliding, disaster management etc.
q) Ecological engineering of urban forestry with respect to global climate change; Role of urban forestry in carbon sequestration and mitigation of rising level of CO_2 in changing environment; assessment of environmental pollution in urbanized environment.

r) Environmental impact assessment and ecological economics of eco-services provided by ecosystems.
s) Nutrient cycling, Soil microbial biomass, nutrient mechanism, mineralization rate and soil organic matter in agro-ecosystems.
t) Stoichiometric changes in nutrient cycling under anthropogenic activities or impact of climate change on biogeochemical cycling in contrasting ecosystems.
u) Ecology of bio-energy crops, establishing plantations in degraded or disturbed area, wood ash their role in energy programme.
v) Plant functional Traits

(b) Teaching: -

a) Most preferable area of teaching in given disciplines at graduate and post graduate level:

a. Plant ecology, Environmental Sciences and Environmental Biology
b. Restoration Ecology, Forestry and Forestry engineering
c. Ecological Engineering
d. Plant biodiversity and Conservation Biology
e. Soil Sciences
f. Biostatistics and Statistical Ecology
g. Ethno-botany and Ethno-pharmacology
h. Plant Pathology

b) Plant sciences in any branch at graduate level:

i. Plant diversity and Applied Botany
ii. Cryptogamic Botany: Algae, Fungi and Bryophytes
iii. Phanerogamic Botany: Pteridophytes, Gymnosperms and Angiosperms
iv. Plant Physiology and Economic Botany
v. Microbiology

B. Education:

- **Doctor of Philosophy (Ph.D.)*,** Department of Botany, Banaras Hindu University Varanasi, Botany (Plant Ecology), **1999**.
- **Master of Science (M.Sc.),** V.P.S. Purvanchal University Jaunpur, Botany (Plant Pathology) 1st division (71.3 percent), **1991**.
- **Bachelor of Science (B.Sc.),** V.P.S. Purvanchal University Jaunpur, Botany, Zoology and Chemistry, 1st division (69.9 percent), **1988**.

* **Topic of Ph.D. thesis:** *Structure, Functioning and impact of Young plantations of four native woody species on coalmine spoil.*

C. Additional Qualifications:

Qualified GATE (Graduate Aptitude Test in Engineering) examination in 1993

D. Position held, professional and research experiences:

a) Employment:

- 23 Dec. 2005- till date---------- Assistant Professor, Department of Botany, Panjab University Chandigarh.

b) Post-doctoral:

- 14 Feb. 2004-April 2005-------- Research Scientist, Laboratory of Forest Ecology and Forestry Engineering, Institute of Applied Ecology, Chinese Academy of Sciences (CAS), Shenyang, PR China.
- 30 Jan. 2003- 30 Sept. 2003------- Research Associate in Ministry of Environment and Forests (MoEn) funded project (Ecological Analysis of Plant Diversity in central highlands), Government of India to Prof. J.S. Singh, Dept. of Botany, BHU, Varanasi.
- 24 Sept. 2001-09 July 2002------ Senior Research Scholar, Institute of Botany, School of Life Sciences, Zhongshan University (ZSU), Guangzhou, PR China.
- 27 May 2000- 24 Aug. 2001------ ---Research Associate in CSIR funded project (Methanotrophs in dry tropical forests) to Dept. of Botany, Banaras Hindu University, Varanasi, India.

c) Doctoral:

- 05 Feb. 1995-04 Feb. 1998---------- Senior Research fellow (SRF), GATE scholarship by University Grants Commission, Govt. of India, Dept. of Botany, Banaras Hindu University, Varanasi, India.
- 01 Dec. 1994-05 Feb. 1995---------- Junior Research Fellow (JRF) GATE Scholarship by University Grants Commission, Govt. of India, Dept. of Botany, Banaras Hindu University, Varanasi, India.
- 05 Feb.1993- 30 Nov. 1994----------Junior Research Fellow (JRF) in Ministry of Coal funded project (An integrated ecological study on revegetation of coal mine spoil) to Prof. J.S. Dept. of Botany, Banaras Hindu University, Varanasi, India.

E. Teaching experiences:

- **Current-**
  a) Teaching of Botany (Plant diversity-I) at undergraduate level and laboratory teaching at postgraduate level since 2005- till date.
  b) Teaching in environmental Sciences as a guest faculty teacher in the department of Environmental science since 2009-2010.
  c) Teaching of Environmental Education as a guest faculty teacher to university level under-graduate students from all disciplines since 2009-2010.
- **Previous-**
  a) Laboratory teaching of Plant Ecology at undergraduate (B.Sc.) and postgraduate (M. Sc.) level since 1995.
  b) Laboratory teaching of Restoration Ecology at undergraduate (B.Sc.) and postgraduate (M. Sc.) level since 1996.

F. UGC/DST/Others Sponsored Professional Courses/ Workshop:

- "**82nd Orientation Course**" organized by the Academic Staff College, Panjab University, Chandigarh, dated on 02.06.09 to 29.06.09.
- Refresher Course in Botany "Diversification of Botany in Present Era" organized by the Academic Staff College, University of Rajasthan, Jaipur from 19.12. 20111 to 07.01.2012.

G. Academic assigned administrative or other related experiences:

- 2009- Performed duty as a Presiding officer in general parliamentary election of Chandigarh-01 Parliamentary constituency at Chandigarh.
- 2006-2008, Secretary, Postgraduate Academic Programme Monitoring and Execution Committee (PGAPMEC) for monitoring and execution of academic progamme in the department; appointed by Board of Control in Botany.
- 2007-2009, Member, Board of control in Botany appointed by university authority to formulate and rectify graduate and post-graduate syllabus etc.
- 2007-2009, Member, Research Degree Committee in Botany appointed by university authority to implement rules regulation pertaining to research programme (Ph.D and M.phil. degree) in the botany department and other relevant matters.

H. Other assigned duties/ experiences:

- Accompanied and supervised to students for Botanical excursion to **Kerala** (Ernakulum and Trivendrum) w.e.f. 01 February to 10 February 2006.
- Accompanied and supervised students for educational excursion to **Rajasthan** (Jodhpur and Jaisalmer) w.e.f. 26 February to 05 March 2007.
- Accompanied and supervised postgraduate students for field survey and plant collections to Mussoorie and periphery w.e.f. 02 September 2008 to 07 September 2008. The purpose of filed study was to know the natural habitats of plant species and to enrich the herbarium in the department.

3. Awards/Honours:

a) Post Doctoral Research Fellowship by National Scholarship Programme (NSP) of the Slovak Republic "**D level as Visiting Researcher**" at Faculty of Ecology and Environmental Sciences, Technical University, Zvolen, Slovakia (6-months in 2013 *not availed*).

b) Visiting Adjunct Professorship by Huitong National Research Station of Forest Ecosystem, Institute of Applied Ecology (IAE), Chinese Academy of Sciences, Shenyang, Chinese Academy of Sciences (CAS), PR China (May 01, 2010 to April 30, 2013).

c) Post Doctoral Research fellowship "**D level**" by Hungarian Scholarship Board (HSB), Institute of Ecology and Botany, Hungarian Academy of Sciences, Budapest, Hungary (2009-2010, *not availed*).

d) UNDESA Scholarship by United Nations Division for Sustainable Development, USA for attending a MASHAV organized training workshop on "*Role of Native and Desert Adapted Plant Species Slowing Desertification Process"* at Arava Institute for Environmental Studies in Kibbutz Ketura, **Israel** (21 March 2009 to 31 March, 2009).

e) Adjunct Associate Professorship by Institute of Applied Ecology (IAE), Chinese Academy of Sciences, Shenyang, Chinese Academy of Sciences (CAS), PR China (January 01, 2007 to December 31, 2008).

f) Post doctoral fellowship by Institute of Soil Biology (ISB), Academy of Sciences of the Czech Republic, Ceske Budejovice, Czech Republic, (2005-2008, *not joined*).

g) Post doctoral fellowship by Institute of Applied Ecology (IAE), Shenyang, Chinese Academy of Sciences (CAS), PR China (2004).

h) Research Associate (R.A.) in MoEn funded project (Ecological Analysis of Plant Diversity in central highlands) by Ministry of Environment and Forests, Government of India to Dept. of Botany, BHU, Varanasi (2003).
i) Senior Research Scholarship by Indo-China Cultural Exchange Programme through Ministry of Human Resource Development, Dept. of Secondary and Higher Education, Government of India, New Delhi and Chinese Scholarship Council (CSC), government of China (2001-2002).
j) Extended Senior Research Fellowship (SRF-Extended), by Council of Scientific and Industrial Research (CSIR), Government of India (1999-2000).

k) Research Associate-ship in CSIR funded project (Methanotrophs population in selected tropical ecosystems) to Dept. of Botany, BHU, Varanasi (2000-2001).

l) Junior Research fellowship (GATE Fellowship); by University grant commission, Government of India (1994-1998).

m) Junior Research fellowship (JRF); by Ministry of Coal, Government of India, funded project to Dept. of Botany, BHU, Varanasi (1993-1994).

n) One year merit Scholarship for obtaining highest score in B.Sc. Bridge course (1989).

4. Listed in:

- MARQUES Who's who in the World, USA.
- Environmental experts in the Indo Gangetic Plains-a directory prepared by Centre for Science and Environment (CSC), New Delhi, India.
- Directory of Asia Pacific Forestry Research Organization (APAFRI).
- Expert Restoration Ecologist directory by Society of Restoration Ecology (SER), UK
- Directory of International Society for Tropical Ecology (ISTE), Department of Botany, Banaras Hindu University, Varanasi, India.

5. Student supervised to date:

Degree/Course	Completed*	Enrolled	Total
PDF/RA	Nil	Nil	Nil
Ph.D.	Nil	five	Five
M.Phil.	Two	one	Three
M.Sc.	Five	Nil	Five

5A. Research under investigation:

a) Ecological Restoration of Coal mine spoil in dry tropical region of India:
Impact of certain native plantations on soil redevelopment, carbon sequestration and Biodiversity reconstruction on coalmine spoil: Implications for Ecological restoration of degraded lands

Significant alterations in the terrestrial biosphere have occurred due to rapid expansion of human population, economic development and associated processes such as deforestation, environmental pollution and contamination. Expansion of industrialization needs massive energy generation for which huge quantity of coal is extracted through mining, causing extensive landscape destruction. About 8000 ha area of previously occupied by forest have been affected

by mining industry in the Singrauli region in a dry tropical environment of northern region where those forest cover are acutely involved to reducing global warming effect in the biosphere.
Therefore, biological restoration and mine spoil management are the key important aspects concerned with mitigation of mining effects on environment. Although the immediate goal of rehabilitation programmes is to establish vegetation cover that will prevent soil erosion, the long-term goal should always be soil ecosystem development. Thus, for the reconstruction of ecosystems and ecological function in post mining landscape, the reconstruction of soil is compulsory. Therefore, objectives of the present investigation is to understand the ecology of biodiversity reconstruction in rehabilitated plots and how plants are playing role in sequestering carbon in the soil component.

b) Role of Extra Cellular Soil Enzymes in carbon sequestration under contrasting Habitats:

Soil enzymes play an important role for mineralization and cycling of nutrients in the soil component. Sources of these soil enzymes in soil medium are living and dead cells like plant roots, microbes and dead remains of animals, plants and microbes. Once the soil enzymes are released in soil, they are no longer associated with any viable cell, so they get stabilized by forming complex with clay particles or humus. Most significant enzymes like cellulase, amylase, β-glucosidase, saccharase, xylanase, chitinase, pectinase, urease, ligninase and catalase etc. perform their activities in the soil. For example, some extracellular enzymes regulate the decomposition process of plant litter as plant litter (dead and debris) are only source of organic matter (OM) in dry tropical environment; therefore, nutrient deposition via litter-fall by decomposition process is only possible. Certain group of soil biota gets carbon and energy from complex compound (organic matter), therefore, they attack on organic matter and break into simpler inorganic form of nutrients, this process is known as mineralization. Present study is under investigation to understand the role of key soil enzymes in the contrasting soil ecosystems of Shivalik range as exploitation (urban encroachment) and anthropogenic activities (industries) are still going with unprecedented rates. Moreover, dynamics of nutrient cycling (an important component of soil) particularly carbon, nitrogen and phosphorus in the soil is not explored

c) Heavy metal distribution in Urban Soils: An Ecological Investigation:

Contamination of soils with heavy metals has become one of the major concerns in soil ecology. Currently anthropogenic inputs of heavy metals are more than the natural inputs encompass more contamination. Major anthropogenic causes are rapid industrialization, automobile exhausts, heavy use of fertilizers and pesticides in agro-ecosystems. In addition, atmospheric depositions (Aeolian) is resulting more contamination on the soil surface. Since, heavy metal distribution is not uniform or homogeneous across soil types and composition; it varies soil to soil, area to area. Therefore, metal distribution is somewhat high concentration in the soil. But in urban ecosystems, anthropogenic activities are perhaps key factor which play significant role in the deposition of undesirable form of heavy metals in the urban areas. Primary objective of our present study is to know the level of heavy metal distribution across urban soils of Chandigarh city along with same form another industrialized area of the selected site. Second, to find out ecological solution how to reduce contamination of highly toxic heavy metals which are unsafe for health, ecosystem and environment? Third, selection of suitable plant species which might be applicable as ideal plants for heavy metal management and further could play a sustainable role in an urban ecosystem.

d) Effect of *Hyptis suaveolens* on developing biodiversity in rehabilitated coal mine spoil habitats in a dry tropical Environment, India

Invasive plants are very prevalent across global scale, so it should not to be a serious point at this issue in India; however, it has become a challenging ecological task due to its spread and dominating prone with unprecedented rates in all set of ecosystems (agriculture, urban and forest) of India. Invasive plants have strong capability to retain ecologically fitted attributes towards to reform a new face according to needs of environmental changes. Perhaps, this is the

main reason of an exotic plant species have better ecological plasticity than native which makes invasion easier in an indigenous plant community. Singrauli Coal field is India's one of the largest coalfield which contribute about 13 % of India's coal production. Most of the mining activities in this area are surface mining. Due to surface mining activities, previously occupied tropical forests been removed and then huge amount of soil burdens deposited on un-mined surface which makes severe degradation of environment. Therefore, environmental degradation in the Singrauli region due to mining activities is still in operation. Restoration and rehabilitation process is not so effective by which alteration could regain its original shape. Selected research sites (Jayant coal mining area) are biologically rehabilitated by plantations of certain native and exotic woody species. Recently, one invasive plant (*Hyptis suaveolens*) has invaded severely in the area. Most of the plantation plots has been invaded and affected by this invasion. Our main objective is to understand the rate and rapidity of invisibility of this exotic invader across plantation plants and what is the impact of this invaded plant on the structure and functioning behaviour of invaded plantation stands. How this plant make sever invasion and what extent it play in the biodiversity development.

.

6. Professional membership:

- Member of International Society for Tropical Ecology (ISTE), Department of Botany, Banaras Hindu University w.e.f. 1993- Till date
- Life member of Panjab University Research Journal w.e.f. 30 March 2006.
- Member of Chinese Journal of Applied Ecology, Institute of Applied Ecology (IAE) Shenyang, PR China since from May 2004-till date.
- Applied for Associate membership of International Union of Forestry Research Organization (IUFRO).
- Applied for membership of Society for Ecological Restoration (SER), UK.
- Applied for subscriber membership of Ecological Society of America (ESA) USA.
- Applied for membership East African Ecological Society (EAES), Kenya.

7. Scientific Services & Activities:

a) Journal Reviewer:

- Acta Ecologica Sinica
- Chinese Journal of Applied Ecology
- Pedosphere
- Current Science
- Silva Fennica
- Journal of Forestry Research
- Journal of Environmental Science
- Journal of Tropical Forest Science

b) Thesis Reviewer:

- Doctoral and Master of Philosophy dissertation from several universities, colleges and institutes of India.

8. Seminar/Symposia/Training programme attended:

a) Invited in National/International Conferences:

1. 23rd IUFRO World Congress 2010 entitled "**Forests for the Future**: Sustaining Society and Environment (Theme: Asia's Forests for the Future-Keep Asia green-

Restoring and Rehabilitating Forest Ecosystems in Asia)", Seoul, South Korea on 23-28 August, 2010.

2. International Soil Science Congress "**Management of Natural Resources to Sustain Soil Health and Quality"** on 26-28 May, 2010 at Ondokuz Mayis University, Samsun, Turkey.
3. International Conference on "**Soil Fertility and Soil Productivity**" division 3 – Soil Use and Management of International Union of Soil Science (IUSS), 17-20 March, 2010, Humboldt University, Berlin, Germany.
4. National Workshop entitled "**Rehabilitation of Degraded lands**" on 6-7 October, 2009 at CSFER, Allahabad.
5. 6th European Congress on "**Ecological Restoration**: Towards a sustainable future European Ecosystems-Providing restoration guidelines for Natura 2000 Habitats and species, 08-12 September, 2008, Ghent, Belgium.
6. 5th International Conference on "**Land Degradation**" (5th ICLD): Moving ahead from assessments to actions, Could we win the struggle with Land Degradation? 18-22 September, 2008 at International center for Advanced Mediterranean Agronomic Studies (CIHEAM), Bari, Italy.
7. 2nd International symposium on **Ecological restoration**, 16-22 April, 2007, Bolivar Convention centre, Santa Clara, Cuba.
8. **Eco Summit**: Ecological complexity and sustainability-Challenges and opportunities for 21st century's Ecology, 22-27 May, 2007, Beijing, PR China.
9. International Conference on **Environmental Research, Technology and Policy** (ERTEP, 2007), 16-19 July, 2007; Accra, Ghana.
10. **3rd Global Boatnic Gardens congress** (Building a sustainable future, the role of Botanic gardens), April 16-20, 2007, Wuhan, China.
11. Ecological Society of America and Society for Ecological Restoration (ESA/SER) joint annual meeting "Ecology **based restoration in a changing world**", 05-10 August, 2007, San Jose, McEnery Convention center, California,USA.
12. IUFRO all division 5 Conference 2007 "**Forest Products and Environment**: A productive symbiosis", 29 Oct. to 02 November, 2007, Grand Hotel, Taipei, Taiwan.
13. 4th International Conference on Soils of Urban, Industrial, Traffic,Mining, and Military areas (SUITMA), 18-27 October, 2007, Nanjing, China.
14. 5th European Congress on "**Ecological Restoration**: Land use changes in Europe as a challenge for restoration-ecological, economical and ethical dimensions; 21-25 August, 2006, Greifswald, Germany.

b) Lectures delivered in national/International Conferences:

1. Training workshop on "***Role of Native and Desert Adapted Plant Species Slowing Desertification Process"*** at Arava Institute for Environmental Studies in Kibbutz Ketura, **Israel** (21 March 2009 to 31 March, 2009).
2. International conference on **Deserts and Desertification: Challenges and Opportunities**, November 6-9, 2006 at Sede Boqer Campaus, Ben-Gurion University of the Negav, Israel.
3. National Seminar on **22nd National Convention on Environmental Engineering** (NCEE) with special emphasis on Cost recovery and pricing of services, April 07-09, 2006 held Department of Civil Engineering, Banaras Hindu University in collaboration with IPHE, India.
4. National Seminar on **Environmental Management** in 21st Century: Issues and Challenges, Feb. 16-18, 2006, held at Department of Botany, Banaras Hindu University, Varanasi.

5. International workshop on **Ecological processes**, Oct. 4-8, 2004, held at Institute of Applied Ecology, Shenyang, The People's Republic of China.
6. IUFRO International workshop on "**Landscape Ecology** 2004" on Oct. 25-28, 2004 held at Forestry and Forest Products Research Institute (FFPRI), Tsukuba, Ibaraki, Japan.

c) Participated in national/International Conferences:

1. National Conference on "**Advances in Biological Sciences"** held at Department of Zoology, Panajab University Chandiagrh on 29-30 March, 2010.
2. **4th Chnadigarh Science Congress** (under section: Plant, Agricultural and Rural Development) held at Panjab University Chandigarh on 19-20 March, 2010.
3. 35th Annual conference of **Environmental Mutagen** society of India & International symposium on mutagens and genetic diversity for health and agriculture held at Panjab University Chandigarh on 12-14 March, 2010.
4. 13th Punjab Science congress on "**Climate change: Concerns and Solutions** by Punjab Academy of Sciences, held at Panjab University Chandigarh on 07-09 February, 2010.
5. International conference on "***Plant invasion and forest ecology: Concerns and Solutions*"** at Panjab University Chandigarh on 16-18 March, 2009.
6. **3rd Chnadigarh Science Congress** (under section: Plant, Agricultural and Rural Development) held at Panjab University Chandigarh on 26-28 February, 2009.
7. **2nd Chnadigarh Science Congress** (under section: Plant, Agricultural and Rural Development) held at Panjab University Chandigarh on 14-15 March, 2008.
8. **1st Chnadigarh Science Congress** (under section: Plant, Agricultural and Rural Development) held at Panjab University Chandigarh on 10-11 March, 2007.
9. National Seminar on **Ecology in India: Retrospects and Prospects**, March 12-13, 1999, held at Dept. of Botany, Banaras Hindu University, Varanasi.
10. National Seminar on **Conservation of Endangered Species and Ecosystems**, Dec. 5-7, 1996, held at dept. of Botany, Banaras Hindu University, Varanasi.
11. National Seminar on Ecology: Current Problems and Future Perspectives, March 10-12, 1995, held at Dept. of Botany, Banaras Hindu University, Varanasi.

d) National/International Training workshop attended:

1. A MASHAV Training workshop on "***Role of Native and Desert Adapted Plant Species Slowing Desertification Process"*** at Arava Institute for Environmental Studies in Kibbutz Ketura, **Israel** (21 March 2009 to 31 March, 2009).
2. IUFRO-SPDC, DNAES & P.U. Sponsored International training workshop on "***Working effectively at the interface of forest science and forest policy"*** held at Panjab University Chandigarh on 14-15 March, 2009.
3. Training workshop on "***16.0 SPSS Faculty Development Programme"*** at Panjab University Chandigarh-160014 (21 August 2008 to 22 August, 2008). This workshop was organized by SPSS South Asia and Statistics Department of PU.
4. National Workshop on **Plant Taxonomy**, held at Department of Botany, Panjab University Chandigarh on Dec. 9-10, 2006.

9. Total Number of Publications: (Journal Impact Factor "JIF", Citation Index "CI"; Until May, 2013):

(a) Published:

1. Shaokui Yan, **A. N. Singh**, Yang Cuia, Yuanliang Lia, Silong Wang, Shenglei Fu, Guangbiao Xu. (2012). A soil fauna index assessing soil quality. *Soil Biology and Biochemistry*, **47**:158-165. (***JIF = 3.242; CI = 7)***

2. S.K. Yan, D.X. Wu, **A.N. Singh**, Y.L. Li, W.S. Wei, Y. Cui, S.L. Wang, 2011. A new assessment method for the quality of ecological monitoring data: Taking CERN's tree growth dataset as a case. Chinese Journal of Applied Ecology, **22**(4): 1067-1074. (***JIF = 0.0; CI= 0).***

3. F.J. Long, D.G. Zhang, **A. N. Singh,** X.J. Su, S.K. Yan, S.L. Wang. 2011. Relationship between understory vegetation and canopy stratum trees in Huitong Forest Region. Journal *of Jishou University (Natural Science Edition)* **32**(1):79-84. (***JIF = 0.0; CI= 0).***

4. Su, X.J., Li, Y.L., **Singh, A.N.,** Yan, S., Zhang, D.G., Wang, S. (2011). Application of indicator species in predicting forest management on forest species diversity and community composition: a comment. *Chinese Journal of Applied Ecology*, **22** (2): 280-286. (***JIF = 0.0; CI= 0).***

5. Yan, R.H., Zhuang, D.F., **Singh, A.N**., Pan, J.J., Qiu,D.S., Shi, R.H. (2009). Estimation of As and Cu contamination in agricultural soils around Boshan mining area of Hunan province, China by reflectance spectroscopy method: A case study. *Pedosphere*, **19** (6):716-726. (***JIF = 0.87; CI= 03).***

6. Yan, S., Singh, A.N., Qiu, H., Zhang, W., Wang, S., Qui, Yang (2009). Pitfalls of DG index in quantifying biodiversity and its intrinsic implication as a community parameter: a comment. *Biodiversity Science*, **17** (5): 524-530. (***JIF = 0.0; CI= 04).***

7. **Singh, A.N.** and D.H. Zeng (2008). Effects of certain indigenous woody plantations on total soil nutrients of coal mine spoils in Singrauli coalfield, India. *Journal of Forestry Research*, **19** (3): 199-203. (***JIF = 0.34; CI= 03).***

8. F. S. Chen, D. H. Zeng and **A. N. Singh** (2006). Seasonal Variation in Soil Nitrogen Availability under Mongolian Pine Plantations in Keerqin Sandy Land, China. *Journal of Arid Environments*, **67**: 226-239. (***JIF = 1.56; CI = 17).***

9. **Singh, A. N.**, Zeng De-Hui and Chen Fu-Sheng (2006). Effect of young woody plantations on Carbon and nutrient accumulation rates in redeveloping soil of coalmine spoil in a dry tropical environment, India. *Land Degradation and Development* **17**:13-21. (***JIF = 1.14; CI = 14).***

10. **Singh, A.N.** and J.S. Singh (2006). Experiments of ecological restoration of coalmine spoil using tree plantation in a dry tropical environment, India: A synthesis. *New Forests* **31**: 25-39. (***JIF = 1.11; CI= 11).***

11. **Singh Anand N.**, Zeng De-Hui and Chen Fu-Sheng (2005). Heavy metal concentrations in redeveloping soil of mine spoil under plantations of certain native woody species in dry tropical environment, India. *Journal of Environmental Sciences*, **117(1)**: 168-174. (***JIF = 0.72; CI = 10).***

12. CHEN Fu-sheng, ZENG De-hui, **SINGH, Anand Narain** and CHEN Guang-sheng (2005). Effects of soil moisture and soil depth on nitrogen mineralization process under Mongolian pine plantations in Zhanggutai sandy land, P. R. China. *Journal of Forestry Research* **16(2)**: 101-104. (***JIF = 0.31; CI = 05).***

13. CHEN Fu-Sheng, ZENG De-Hui, FAN Zhi-Ping, CHEN Guang-Sheng and **Singh, A. N.** (2005). Comparative nitrogen mineralization and its availability in certain woody plantations

in Keerqin Sand Lands, China. *Acta Ecologica Sinica*, **26**(2) 341-348. (***JIF = 1.41 based on Chinese Science citation Index; CI = 3).***

14. **Singh, A.N.,** A.S. Raghubanshi and J.S. Singh (2004). Comparative performance and restoration potential of two *Albizia* species planted on mine spoil in a dry tropical region, India. *Ecological Engineering*, **22**: 123-140. (***JIF = 2.203; CI = 21).***
15. **Singh, A.N.,** A.S. Raghubanshi and J.S. Singh (2004). Impact of native woody plantations on mine spoils in a dry tropical environment. *Forest Ecology Management*, **187**:49-60. (***JIF = 2.21; CI = 18).***
16. **Singh, A.N.**, A.S. Raghubanshi and J.S. Singh (2004). Survival and growth pattern of three tropical plantations raised on coalmine spoil of Central India. *The Indian Forester*, **127(4)**: 374-384. (***JIF = 0.0; CI = 04).***
17. **Singh, A.N.**, A.S. Raghubanshi and J.S. Singh (2002). Plantations as a tool for mine spoil restoration. *Current science*, **82**: 1436-1440. (***JIF = 0.97; CI = 49).***
18. Jha, A.K., Arvind Singh, **A.N. Singh**, and J.S. Singh. 2001. Influence of mulching on plant growth performance in young plantation plots on coalmine spoil. *The Indian Forester*, **127**: 785-787. (***JIF = 0.0; CI = 2).***
19. Jha, A.K., Arvind Singh, A.N. Singh and J.S. Singh (2000). Evaluation of direct seeding of tree species as a means of revegetation of coalmine spoils. *The Indian Forester*, 126: 1217-1221. (***JIF = 0.0; CI = 2).***
20. **Singh, A.N.** and J.S. Singh (1999). Biomass, net primary production and impact of bamboo plantation on soil redevelopment in a dry tropical region. *Forest Ecology Management*, **119**: 195-207. (***JIF = 2.21; CI = 38).***
21. Singh, Hema, S.K. Singh, **A.N. Singh** and A.S. Raghubanshi (1999). Impact of plant residue quality on the size of the microbial biomass pool and net N-mineralization. Tropical Ecology, 40: 313-318. (***JIF = 0.5; CI = 07)***

(b) Research Articles in Books chapter/ Proceedings/others:

22. Rai, D.V. and **A. N. Singh** (2007). Environmental Biodiversity. In: Rai, D.V., Behari, J. and Koul A. (Eds): Current Issues and Solutions on Environmental Sciences. Ideal Publishers, Chandigarh, India. (***JIF = 0.0; CI = 0).***
23. Hu, Z., Zhu, J.J. and **A. N. Singh** (2007). Human dominated Ecosystems: A risk and benefit assessment. In: Rai, D.V., Behari, J. and Koul A. (Eds): Current Issues and Solutions on Environmental Sciences. Ideal Publishers, Chandigarh, India. (***JIF = 0.0; CI = 0).***
24. **Singh, A. N.** (2006).Ecological engineering as a modern tool for Restoration of Degraded Lands: A case study of coal mine spoil in dry tropical Region of India. Proceedings of 22nd National convention on Environmental Engineering (NCEE) with special emphasis on cost recovery and pricing of services, department of Civil Engineering, IT, BHU, Varanasi. pp. 209-216. (***JIF = 0.0; CI = 0).***
25. **Singh, A. N**., Zeng De-Hui Chen Fu-Sheng and Z.Y. Yu (2004). Restoration of opencast coalmine spoils by young teak (*Tectona grandis*) plantation in a dry tropical environment, India. In: Sano, M., A. Miyamoto and K. Sugimura (Eds.): *Conservation and management of fragmented forest landscapes*. Proceedings of IUFRO International workshop on Landscape Ecology 2004, Forestry and Forest Products Research Institute (FFPRI), Tsukuba, Ibaraki, Japan. pp. 14-23. (***JIF = 0.0; CI = 0).***

26. CHEN Fu-sheng, ZENG De-hui, **SINGH, Anand Narain** (2004). Effects of stand ages and management practices on soil nitrogen availability under Mongolian pine plantations in southeastern Keerqin Sandy Lands, China. Conference of Forest Soil in China. Deqing, China. Pp. 34-41. (***JIF = 0.0; CI = 0).***

(c) Research Papers Communicated:

27. **Singh, A. N.,** (2013). Comparative soil carbon sequestration efficiency of exotic and native woody plantations on coal mine spoil in dry tropical environment of India. *Land Degradation and Development*, UK.
28. **Singh, A. N.,** (2013). Comparative performance of exotic and native woody plantations on coal mine spoils in India: A case study. *Ecological Engineering*, the Netherlands.
29. **Singh, A. N.**, (2013). Ecological restoration of coalmine spoils by establishing certain woody plantations in a dry tropical environment, India. *Plant and Soil*, the Netherlands.
30. **Singh, A.N.,** (2013). Leaf nitrogen as a possible modulator for ecosystem development in a rehabilitated coal mine spoil. *Ecological Engineering*, the Netherlands.
31. **Singh, A.N.,** (2013). Structure, functioning and impact of teak plantations on soil redevelopment in Singrauli coalmine spoil, India. *Ecological Research,* Japan.
32. **Singh, A.N.**, (2013). Spoil characteristics under five years old native woody plantations and unplanted dump in dry tropical environment, India. *Geoderma*, the Netherlands.

(d) Under preparation:

33. **Singh, A.N.,** Biodiversity reconstruction beneath certain woody plantations on coal mine spoil and their impact on soil rehabilitation in dry tropical region, India. *Basic and Applied Ecology*. Germany.
34. **Singh, A.N.**, High productivity of young woody plantations evidences for a rapid accumulation and storage of carbon in a newly re-vegetated coalmine spoil, India. *Ecological Engineering*, the Netherlands.
35. **Singh, A.N.**, Comparative performance of *Albizia lebbeck* and *Tectona grandis* plantations on coal mine spoil and their use in soil redevelopment process. *Land Degradation and Development,* UK.
36. **Singh, A.N.,** Comparative effect of legume and non-leguminous tree plantations on soil redevelopment in a dry tropical region, India. *Restoration Ecology,* UK.
37. **Singh, A.N.**, Comparative performance of *Albizia lebbeck* and bamboo plantations on soil redevelopment in a dry tropical region. *New Forests.* The Netherlands.
38. **Singh, A.N.**, Litter fall pattern and leaf litter decomposition of young woody native species raised on coal mine spoil: Effect on soil redevelopment. *Biology and Fertility of soil*.
39. **Singh, A.N.,** Standing nutrient stock, cycling of N and P and their use efficiency of four young woody plantations raised on mine spoil in a dry tropical region. *Annals of Botany*, UK.
40. **Singh, A.N**. Conditions after re-vegetated coal mine habitats in a dry tropical region, Singrauli, India. *Land Degradation and Development*, UK.
41. **Singh, A.N.** Comparative N-mineralization rates nitrification and nutrient availability under young woody plantations on coalmine spoil in dry tropical environment. *European Journal of Soil Biology*, France.
42. **Singh, A.N.** Soil carbon sequestration under different native woody plantations on coal mine spoil in a dry tropical region of India. *Forest Ecology and Management*, the Netherlands.
43. **Singh, A.N**. Influence of stocking density and stand basal cover of planted species on developing plant diversity in a rehabilitated coal mine spoil of India. *Forest Ecology and Management*, the Netherlands.
44. **Singh, A.N**. Influence of developing canopy cover of planted species on developing plant diversity in rehabilitated coal mine spoils of India. *Ecological Engineering*, the Netherlands.

45. **Singh, A.N** and N.K. Sharma. Herbaceous biomass act as nutrient source in a redeveloping ecosystem of rehabilitated coal mine spoils in a dry tropical region of India. *Journal of Forestry Research*, Japan.

46. **Singh, A.N.** Effect of stocking density on growth pattern of certain native woody plantations on coal mine spoils in a dry tropical region of India. *Journal of Forestry Research*, China.

47. **Singh, A.N**. Growth behaviour, biomass pattern and culm recruitment of high density bamboo plantations on coal mine spoils in a dry tropical region of India. *Journal of Forestry Research*, China.

48. Jiaojun Zhu, **Singh, A.N.** Zeng De-Hui, Hongzhang Kang and Fan Zhiping. Causes and consequences of declining planted forests of Mongolian pine in semi arid sandy land of northern China. *Current Science*, India

49. **Singh A.N**. An overview of Kamala tree**:** Ecology, distribution and medicinal uses. *Current Science*.

50. **Singh A.N**. Uses and Ecological Importance of Medicinal plants to the local people of Lower Shivalik range of India: A reconnaissance survey, *Journal of Ethno pharmacology*.

(e) Published Abstract in National/International conferences:

1. **Singh A. N.** (2010). How Biological Invasions affects Plant functional traits and Soil carbon sequestration of invaded ecosystem in a changing environment? In **13th Punjab Science congress on "Climate change: Concerns and Solutions** by Punjab Academy of Sciences, held at Panjab University Chandigarh, 07-09 February, 2010.
2. **Singh A. N.** (2010) Phytoremediation efficiency of certain woody plant species raised on contaminated coal mine spoils in a dry tropical region India. International conference "**Environmental Pollution, Restoration and Management** (under theme: environmental remediation and restoration) held on 01-05 March 2010 at Ho Chi Minh City, Vietnam.
3. Suvi Aggarwal and **Singh A. N.** (2010). Urban forestry act as a tool for carbon sequestration in a changing environment: Implications for sustainable development and Climate change in "**4th Chnadigarh Science Congress:** Energy Security and Environmental Challenges**"** (under section: Plant, Agricultural and Rural Development) held at Panjab University Chandigarh on 19-20 March, 2010.
4. Yamini Sharma and **Singh A. N.** (2010). Forest ecosystems act as source and sink of carbon: Ecology of carbon sequestration in a changing environment, a synthesis, in "**4th Chnadigarh Science Congress:** Energy Security and Environmental Challenges**"** (under section: Plant, Agricultural and Rural Development) held at Panjab University Chandigarh on 19-20 March, 2010.
5. Rajdeep Kaur and **Singh A. N.** (2010). Ecology of phytoremediation: Mechanism, pattern, process, challenges and opportunities in a changing environment, a synthesis, in "**4th Chnadigarh Science Congress:** Energy Security and Environmental Challenges**"** (under section: Plant, Agricultural and Rural Development) held at Panjab University Chandigarh on 19-20 March, 2010.
6. **Singh A. N.** (2010).Biodiversity reconstruction in a rehabilitated coal mine spoil in a dry tropical region, India: A case study in **IUFRO world Congress,** 23-28 August, 2010, South Korea.
7. **Singh A. N.** (2010). Soil carbon sequestration and biodiversity reconstruction in rehabilitated coalmine spoil in a dry tropical region, India: A case study in **International Soil Science Congress**, 26-28 May, 2010, Ondokuz Mayis University, Samsun, Turkey.
8. **Singh A. N.** (2009). Plantation ecology act as a tool for developing desirable forests on waste lands in India, an approach to sustainable development: A synthesis in International conference on "**Plant invasion and forest ecology: Concerns and Solutions"** at Panjab University Chandigarh on 16-18 March, 2009.
9. **Singh A. N.** (2009). Comparative restoration efficiency of certain exotic and native woody plantations on redeveloping soil of degraded coal mine habitat in India: A case study in National Workshop entitled "**Rehabilitation of Degraded lands"** on 6-7 October, 2009 at CSFER, Allahabad.
10. **Singh A. N.** (2009). Opportunities and Challenges of Ecological Restoration in India: A synthesis in **3rd Chnadigarh Science Congress** (under section: Plant, Agricultural and Rural Development) held at Panjab University Chandigarh on 26-28 February, 2009.
11. **Singh A. N.** (2008). Effects of certain woody plantations on redeveloping soil of coal mine spoil in a dry tropical environment in India: a case study. International conference on "**Land Degradation**" (5th ICLD) held on 18-22 September, 2008 at International center for Advanced Mediterranean Agronomic Studies (CIHEAM), Bari, Italy.
12. **Singh A. N**. (2008). Ecological restoration of coal mine habitats by plantations of certain indigenous woody species in a dry tropical environment, India in **6th European Congress on "Ecological Restoration**: Towards a sustainable future European Ecosystems-Providing restoration guidelines for Natura 2000 Habitats and species, 08-12 September, 2008, Ghent, Belgium.
13. **Singh A. N.** (2007). Characteristics of redeveloping soil under five year old native woody plantations on coal mine spoil in a dry tropical areas, India in **4th International Conference on Soils of Urban, Industrial, Traffic,Mining,**

and Military areas (SUITMA), 18-27 October, 2007, Nanjing, China.

14. **Singh A. N.** (2007). Carbon sequestration efficiency of certain woody species planted on coal mine spoil: An implications of C management in redeveloping ecosystem in **Eco Summit: Ecological complexity and sustainability-Challenges and opportunities for 21st century's Ecology**, 22-27 May, 2007, Beijing, PR China.
15. **Singh A. N.** (2007). Comparative growth pattern and biomass accumulation ob *Albizia lebbeck* and Teak plantations on Jayant coal mine spoil: An implication for biodiversity reconstruction and ecosystem development in **International Conference on Environmental Research, Technology and Policy** (ERTEP, 2007), 16-19 July, 2007; Accra, Ghana.
16. **Singh A. N.** (2007). Restoration of coalmine spoils by Teak plantations in a dry tropical area of India: Teak a versatile tree for incredible wood quality in IUFRO all division 5 Conference 2007 "**Forest Products and Environment**: A productive symbiosis", 29 Nov. to 02 October, 2007, Grand Hotel, Taipei, Taiwan.
17. **Singh A. N. (2007).** Ecological restoration of coal mine spoils by certain indigenous woody plantations in dry tropical region of India: Impact of species on soil redevelopment in **Ecological Society of America and Society for Ecological Restoration (ESA/SER) joint annual meeting "Ecology based restoration in a changing world**", 05-10 August, 2007, San Jose, McEnery Convention center, California,USA.
18. Zhu Jiao-jun, Lee, Feng-qin, Xu Mei-ling, Kang, Hong-zhang, **Singh, A. N.** and Wu Xiang-yun (2006). Performance of Ectomycorrhizal fungi on decline of Mongolia Pine plantations in the semiarid sandy land of northern China in **1st Chnadigarh Science Congress** (under section: Plant, Agricultural and Rural Development) held at Panjab University Chandigarh on 10-11 March, 2007.
19. **Singh A. N. (2007**). Ecological restoration of degraded coal mine spoils by certain suitable species in a dry tropical environment, India: A case study in 2nd International symposium on **Ecological restoration,** 16-22 April, 2007, Bolivar Convention centre, Santa Clara, Cuba.
20. **Singh A. N.** (2006) Ecological Restoration of degraded wetland ecosystems of India: Concept and strategies in **12th world lake conference (Taal)** by Ministry of Environment and Forests, Govt. of India , 28 October-02 November 2007, Jaipur, India.
21. **Singh A. N.** (2006) Comparative performance of exotic and native woody plantations on coal mine spoils in India: A case study. International conference on "**Deserts and Desertification: Challenges and Opportunities**" held on 06-09 November 2006 at The Ben-Gurion University of the Negav, Sede Boqer, Israel.
22. **Singh A. N.** (2006) Comparative effect of legume and non-leguminous plantations on coal mine spoil ina dry tropical region, India in **5th European Congress on "Ecological Restoration:** Land use changes in Europe as a challenge for restoration-ecological, economical and ethical dimensions; 21-25 August, 2006, Greifswald, Germany.
23. **Singh A. N.** (2006). Ecological Engineering as a modern tool for Restoration of Degraded lands: A case study of coal mine spoil in a dry tropical region, India. National Seminar on "**22nd National convention on Environmental Engineering** (NCEE) with special emphasis on cost recovery and pricing of services" held on 07-09 April 2006 at department of Civil Engineering, Institute of Technology, Banaras Hindu University in collaboration with IPHE, India.
24. Chen F. S., **A. N. Singh** and D. H. Zeng (2006). Effects of afforestation on soil N-mineralization in Zanggutai sandy land, China. National Seminar on "**Environmental Management in 21st Century: *Issues and Challenges***" held on 16-18 Feb. 2006 at department of Botany, Banaras Hindu University, Varanasi, India.
25. **Singh A. N.**, Zeng De-Hui and Chen Fu-Sheng (2004). Ecological restoration of coalmine spoils by establishing certain woody plantations in a dry tropical environment, India. International workshop on "**Ecological processes**" held on 4-8 Oct. at Institute of applied Ecology, Shenyang, China.
26. **Singh A. N.,** Zeng De-Hui Chen Fu-Sheng and Z.Y. Yu (2004). Restoration of opencast coalmine spoils by young teak (*Tectona grandis*) plantation in a dry tropical environment, India. IUFRO International workshop on "**Landscape Ecology** 2004" held on 25-28 Oct. Tsukuba, Ibaraki, Japan.
27. **Singh Anand N.,** Li Mingguang, Zeng De-Hui and Chen Fu-Sheng (2004). Effect of different ecological restoration models on soil properties in subtropical region of Southern China. IUFRO International workshop on "**Landscape Ecology 20**04" held on 25-28 Oct. Tsukuba, Ibaraki, Japan.
28. **Singh, A.N.** (2003). Growth pattern and biomass accumulation of certain woody plantations raised on coalmine spoil in dry tropical environment, India. National Seminar on "**Ecology in India: Retrospect and Prospects**" held on 21-23 Oct. dept. of Botany, Banaras Hindu University, Varanasi.
29. **Singh, A.N.** (1999). Phenological observations of certain young woody-planted species on coalmine spoil in dry tropical Environment, India. National Seminar on **"Ecology in India: Retrospect and Prospects**" held on 12-13 March, dept. of Botany, Banaras Hindu University, Varanasi.
30. Jha, A.K., Arvind Singh, **A.N. Singh**, and J.S. Singh. (1995). An integrated ecological study on revegetation of coalmine spoils. National Seminar on "**Ecology: Current Problems and Future Perspectives**" held on 10-12 March, department of Botany, Banaras Hindu University, Varanasi.

(f) Total number of publications and Citations:

Journals	21
Proceedings/Books chapter	05

Communicated	06
Under preparation	18
Total	**50**
Total number of published abstracts	**30**
*Total number of citations	180 (based on Web of Science data base only)

* Citation index might be more than (>250) by SCOPUS and other databases.

10. Research project received/In progress/Completed/ Applied:

a) Impact of certain native plantations on soil redevelopment, carbon sequestration and Biodiversity reconstruction on coalmine spoil: Implications for Ecological restoration of degraded lands. Funded by University Grants Commission (UGC), Govt. of India, New Delhi under major research project (**Rs. 6.70 Lakh)** for the period of 01 February 2010 to 31 July, 2013.

b) Evaluation of Tropical Woody Plant Species for Phytoremediation of Heavy Metals and Organic contaminants in contaminated Soil. Submitted to CSIR, Government of India, New Delhi. (**Submitted with total grant Rs. 13.04 Lakh**).

c) An Integrated Ecological study of Restoration Perspective on Revegetated Coal Mine Spoil in Dry Tropical Region. Submitted to the Ministry of Environment & Forests, Government of India (**Submitted with total grants Rs. 48, 23,100/- Forty eight lakh, twenty three thousand and one hundred**).

11. Travel grants/Field trip/Educational etc. received/Applied:

a) **Full support** (including all, hospitality, travel, medical insurance, field study etc.) in Israel by Ministry of foreign affairs, Israel (**MASHAV**) and international travel and per diem by UNDESA scholarship by UNO, USA for attending Training workshop on "*Role of Native and Desert Adapted Plant Species Slowing Desertification Process"* at Arava Institute for Environmental Studies in Kibbutz Ketura, **Israel** (21 March 2009 to 31 March, 2009.

b) Partial travel grants by Council of Scientific and Industrial Research (CSIR), International S&T Division, Government of India for participating in 6th European Congress on "**Ecological Restoration**: Towards a sustainable future European Ecosystems-Providing restoration guidelines for Natura 2000 Habitats and species, (08-12 September, 2008) Ghent, Belgium.

c) Partial travel grants by Department of Science and Technology (DST), SERC Division, Government of India for participating in 5th European Congress on "**Ecological Restoration**: Land use changes in Europe as a challenge for restoration-ecological, economical and ethical dimensions (21-25 August, 2006) at Greifswald, Germany.

d) **Full support** (including all, hospitality, travel, medical insurance etc.) by organizing committee of International conference on **Deserts and Desertification: Challenges and Opportunities**, November 6-9, 2006 at Sede Boqer Campus, Ben-Gurion University of the Negav, Israel.

e) **Full support** (including all, hospitality and field excursion etc.) by organizing committee of International **workshop on Ecological processes**, Oct. 4-8, 2004, held at Institute of Applied Ecology, Shenyang, The People's Republic of China.

f) **Partial travel grants** by Institute of Applied Ecology/Chinese Academy of Sciences and half financial assistance (hospitality and registration waived off)by organizing committee of IUFRO International workshop on "Landscape Ecology 2004" on Oct. 25-

28, 2004 held at Forestry and Forest Products Research Institute (FFPRI), Tsukuba, Ibaraki, Japan.