ECOLOGICAL STUDY OF NATURAL AND DEGRADED FORESTS OF CHITREPANI, MAKAWANPUR DISTRICT, NEPAL

BY
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A DISSERTATION SUBMITTED FOR
THE PARTIAL FULFILMENT OF THE REQUIREMENT FOR
M.Sc. IN BOTANY

CENTRAL DEPARTMENT OF BOTANY
TRIBHUVHAN UNIVERSITY, KIRTIPUR,
KATHMANDU, NEPAL
April, 1997

CENTRAL DEPARTMENT OF BOTANY
TRIBHUVAN UNIVERSITY, KIRTIPUR

This dissertation work entitled "Ecological Study of Natural and Degraded Forests of Chitrepani, Makawanpur district, Nepal", submitted by Ms Ranju Shrestha, has been accepted as partial fulfilment of the requirement of M. Sc. in Botany.

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CERTIFICATE

This is to certify that the M. Sc. dissertation work entitled "**Ecological Study of Natural and Degraded Forests of Chitrepani, Makwanpur district, Nepal**" by Ms Ranju Shrestha was carried out under my supervision. This research work, submitted towards the partial fulfilment of the requirement for M.Sc. in Botany, has not been submitted for any other degree.

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ACKNOWLEDGEMENT

First I would like to thank sincerely my Supervisor Prof. Dr P. K. Jha for his constant support and guidance without which this work would not have been complete ; and I learnt a lot while working under him.

I am thankful to Prof. D. N. Bajracharya, Chairman, Central Department of Botany, Tribhuvan University for allowing me to use the laboratory facilities. I am very grateful to Dr K. K. Shrestha who helped me a lot in identifying the plant specimens, which was one of the important aspects of my work.

I would like to thank Prof. Elinor Ostrom, Co-Director, Workshop in Political Theory and Policy Analysis, Indiana University, Bloomington, USA and AFORDA Pvt. Ltd, Kathmandu, Nepal for allowing and providing me necessary support under the IFRI (International Forestry Resource and Institutions) Research programme to undertake my dissertation work ; and Mr A. Sterk, Chief Technical Advisor, Hills Leasehold Forestry and Forage Development Project (GCP/NEP/049/NET) for allowing and supporting me to work in the project area. I would also like to express my gratitude to Royal Nepal Academy for Science and Technology (RONAST) for granting me a scholarship to carry out this dissertation work. I would like to thank Mr. Charles M. Schweick, member IFRI Research Programme, Indiana University for helping me in some data analysis. I am grateful to the staff members of Central Department of Botany, Trivhuvan University for helping me in the lab work.

I am indebted to my friend Ms Shikha Shrestha for her continuous help in completing this work. I am very grateful to my friend Mr Parshuram Acharya for his constant support and timely suggestions during this work whose understanding and helping hand was always there for me. I am also very grateful to my father Mr Rajendra P. Shrestha and mother Mrs Nirmala Shrestha whose love, understanding and support I cannot express in words; and my sister Ms Manju Shrestha who eventhough being far away was always very eager for me. Lastly I would like to thank all my other friends and people who have been of help for me in someway.

ABSTRACT

This work was carried out in the forests in Chitrepani site near Hetauda municipality in Makawanpur district of mid-Nepal. This place occurs in and around Siwalik range and both vegetation and soil study was done in the area. There were total 46 species belonging to 27 different families among which 28 were tree species and 18 were shrub and under shrub species. The Natural forests had 8-23 tree species while Degraded forest had only 5 tree species showing a loss of about three-fourth tree species. Number of shrub and under shrub species in Natural forests ranged from 5 to 16 while Degraded forest had 5 species representing only 27.8% out of total shrub species. *Sal* (*Shorea robusta*) was the most dominant species in all the sites. Total tree Density ranged from 57-1326 pl/ha in Natural forests and 8-32 pl/ha in Degraded forest. Sapling density ranged from 5457-17861 pl/ha in Natural forests and 433-2440 pl/ha in Degraded forest while shrub density ranged from 796-7680 pl/ha in Natural forests and 1238-3625 pl/ha in Degraded forest. Total basal area or dominance value ranged from 3.8-59.64 m^2/ha for trees, 5.74-26.16 m^2/ha for saplings and 0.48-7.16 m^2/ha for shrubs in Natural forests while 5.36-11.39 m^2/ha for trees, 0.39-2.15 m^2/ha for saplings and 0.73-1.95 m^2/ha for shrubs in Degraded forest. Total aboveground biomass of trees in September ranged from 337.68-807.83 t/ha in Natural forests while it was 160.63 t/ha in Degraded forest. The biomass of herbaceous plants above ground ranged from 88.9-1154.2 kg/ha in Natural forests while 354.6-2735.4 kg/ha in Degraded forest. The soil of the site had sandy loam texture with 56-68% sand, 25-34 % silt and 7-16 % clay in different forests. Water holding capacity ranged from 36.7-46.3 % and surface soil moisture ranged from 1.6-14.5 % in three seasons. pH range was 5-5.5, Organic matter 1.5-3 %, Nitrogen 0.04-0.09 %, Phosphorus 70.5-94.4 kg/ha and Potash 86.4-262.8 kg/ha.

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1. INTRODUCTION

1.1 Background

The world is facing the problem of deforestation and environmental degradation and Nepal is no exception. Nepal has around 5.5 million hectares of forests representing only about 37% of a total land area ; with the annual rate of deforestation of 0.4% between the period 1964-1986(HMGN/ADB/FINNIDA, 1988; EPC, 1993). It can be attributed to different reasons, viz human population growth, leading to more demand for farming land, fuelwood, fodder, and timber, etc. As a result there is encroachment into the forests and to supplement their needs people are cutting trees and clearing the forests in such a rate that forest degradation has become a serious problem in all places i.e., in hills, valleys and terai. The once dense *"Char Kose Jhadi"* (literally meaning in Nepali, 8 mile wide forest strip) in terai which was present all along the length of the country is now in the form of a mere strip of forest. Different steps taken by the government to preserve our forest wealth have been a mixed success. Various reforestation programmes have been on a small scale with only about 99 thousand hectares including government, community, private and leasehold plantations between 1985-1992(EPC, 1993). This is considerably less than the area lost each year. As a result, it is feared that more and more plant species are being endangered and many more are facing threat of extinction. The present study site is also subjected to the same set of problems. This place occurs in and around the Siwalik range, which is the youngest of the Himalayan mountains formed by the tectonic movement of the Tethys sea. Thus it is very fragile both ecologically as well as geologically. It is made of loosely set gravels, pebbles and sand; and this region gets a high rate of precipitation. Thus it is highly susceptible to soil erosion and the rivers passing through it are loaded with heavy sediments. In this region population pressure has also increased due to migration from hilly regions ever since the

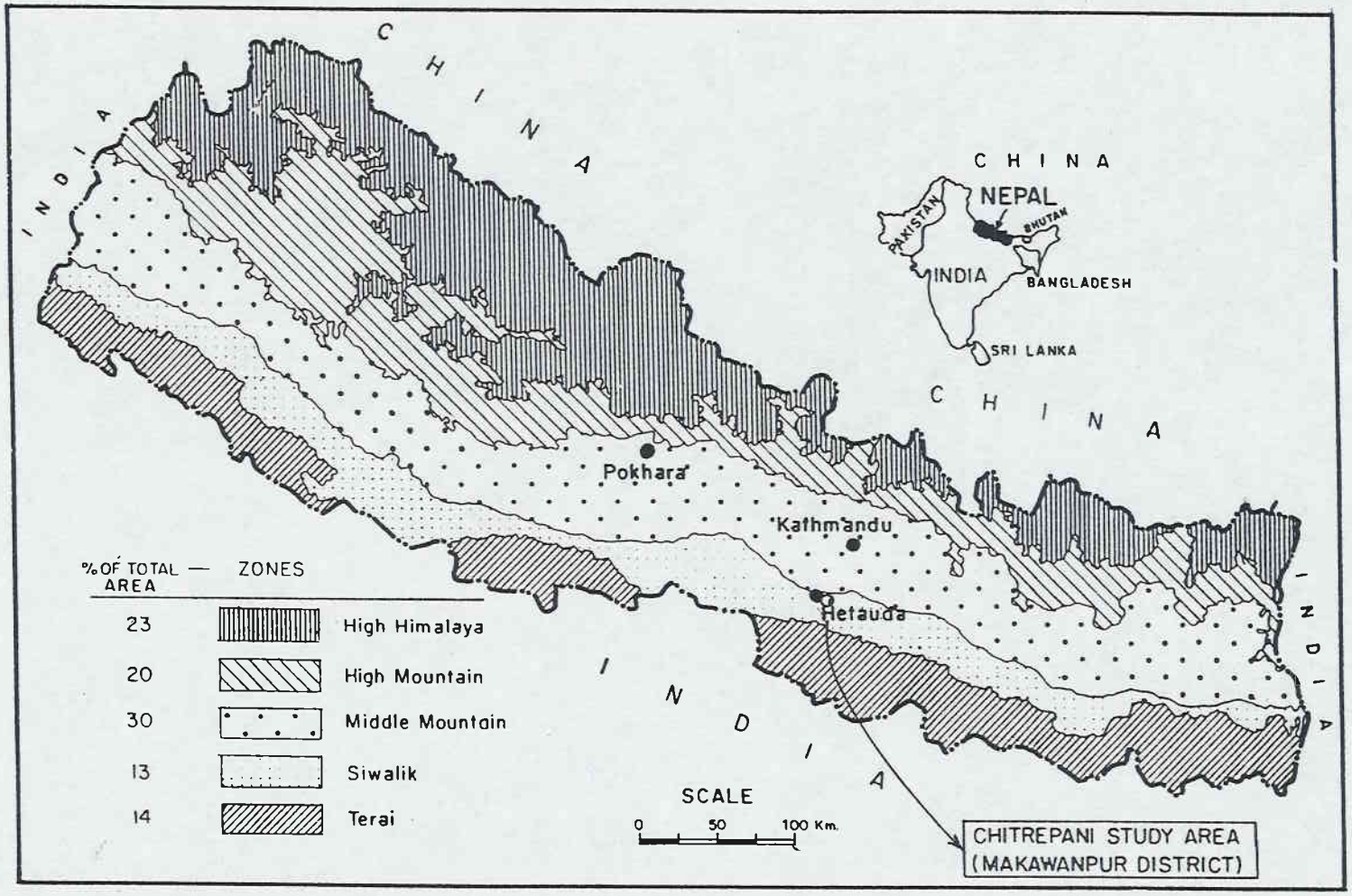
eradication of Malaria during the decade of 1950s(Shrestha and Joshi, 1996), which led to the degradation of forests and clearing it for agriculture. Thus this region is ecologically important to be studied so that it may be useful for taking ameliorative measures to preserve the remaining forests. In this area government has started pilot Leasehold forestry program to rehabilitate and reverse the current process so as to sustain the resource system while assisting the poor farmers raise their income. The present work is an effort to study the forests in the area so as to know its present condition; in which, a degraded(Leasehold forest block), a natural(less disturbed) and a regenerating patches of forests are studied and analyzed. This kind of work, in my knowledge, was not done in this area previously.

1.2 Brief Description of Nepal

Physiography

Nepal, the Himalayan kingdom of south Asia, lies in between the two massive countries ie., China in the north and India in the east, south and west. It lies between the latitudes of $26^0 20'$N and $30^0 10'$N and longitudes of $80^0 15'$E and $88^0 10'$E; thus having a roughly rectangular shape. The east west length is 830 km while the average north south width is 200 km, which varies between 145 km to 242 km. The country is broader in the west than towards the east. The total area of Nepal is 147,181 sq km.

Nepal represents the one third(800 km) of the entire length of the greater Himalayas of 2500 km(Shrestha and Joshi, 1996). Though a very small country, there is a sharply varying altitudinal diversity in a narrow width of 200 km. It ranges from 70 m above sea level in the Terai plains to 8848 m above sea level, the tallest peak of the world, the Mt. Everest. Thus Nepal in a very small area has a wide spectrum of geographical features, elevational ranges and biological diversities.



Map 1 *Physiographic zones of Nepal.*