

10/06/92

Veg Samp Analysis

Outlines

Tengumarada

Mammals on the plateau 580m.

Black buck S
Chital S
Sambar H
Panther H
Black Naped Hare T
Langur S
Honey S
Giant Squirrel S

Hyena pug marks S
Otter pug marks S

Elephants seasonal usage - a lot
of them in ~~the~~ dry season winter season.
till March - April.

Feral buffals

56 X0056I20250181623DBTYR ✓
57 F0057I20250181629LBTYL ✓
58 F0058I20250181635DBAYR ✓
59 A0059I20250181641GYA--16PK ✓
60 X0060I20250181641RTAYL ✓
61 A0061I20250181641RTAYL ✓

Forrestal 04

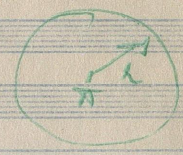
Kubbal Murug
Valla
beat

Metanadu Sarvu
Kodanadu Sarvu
Hatti Ansa Mulai
Kkhar - Tangai para
Hattivani Vottai

Pudukadu
on bus track Tulu kkan patti

Arval Seeding

Bamboo
Tamarind
Vagai
Accha mare



VB61
 WB62

Total Stalvebe

of Sp.
 Prop. of each

Density. No. of stems:

Density No. of stems / ha.
 Basal area / ha $\frac{\pi \times r^2}{4}$

VB640

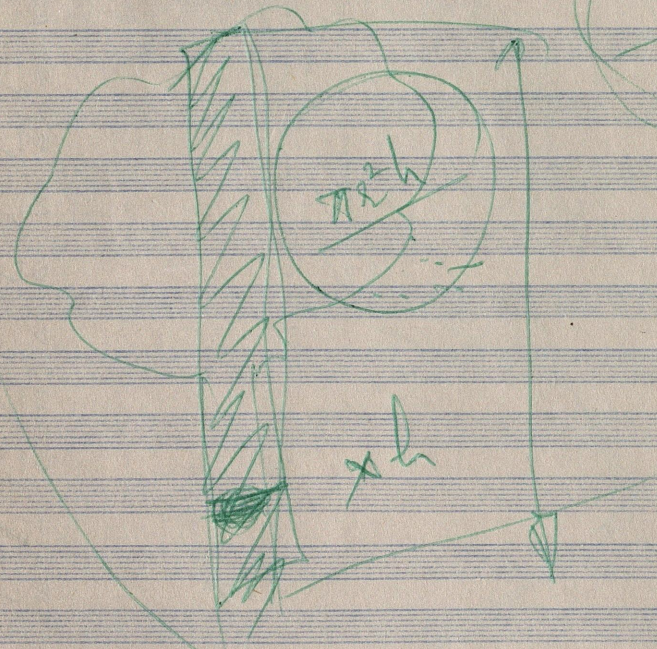
$$2\pi r = D$$

$$r = \frac{D}{2\pi} \quad r^2 = \frac{D^2}{4\pi^2} \quad \frac{\pi \times D^2}{4\pi^2}$$

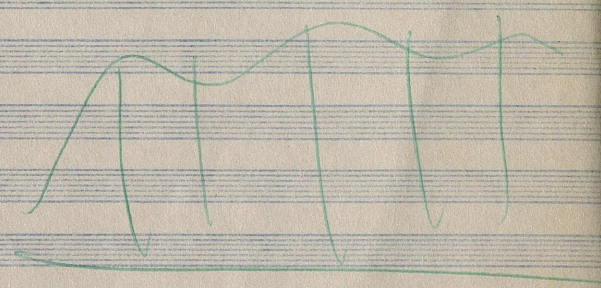


Basal area = $\frac{D^2}{4\pi} \times 10 / ha$

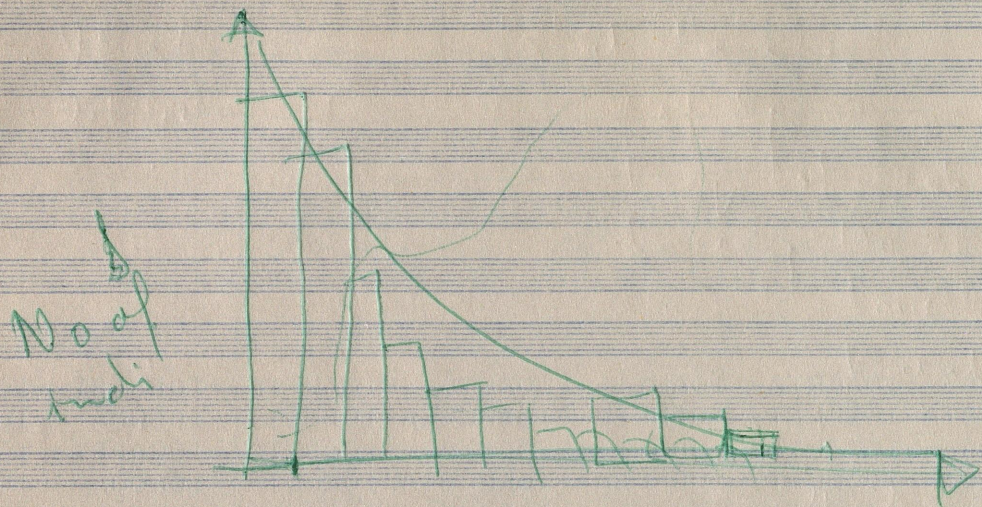
Bromals = _____ / ha



- 1
- 2
- 3
- 4
- 5

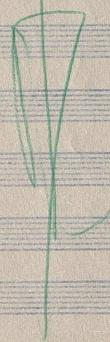
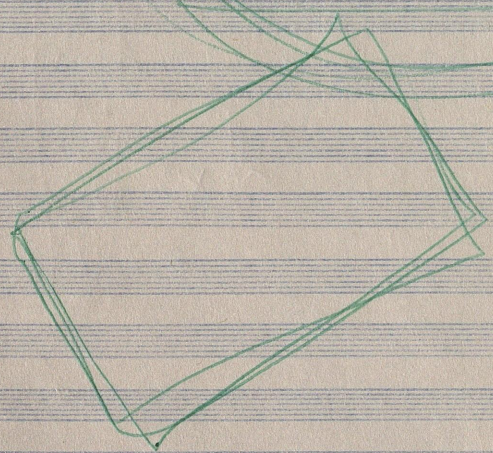


VB61



→ Species

NB, 1. ~~1888~~ PLACE ; LAT - LONG ; ~~REMARKS~~
 ALTITUDE ←
 RAINFALL:
 REMARKS.



Vegetation Sample Analysis

Analysis of in spatial scales of

10mts \rightarrow 250m.

for each transect

4. The parameters that are measured and their characteristics.

1) Species. — Nominal variable

2) Species abundance

3) Species distribution in contiguous patches

4) girth

5) Height

6) Bole height

} Continuous variable of length.

7) Canopy cover for the whole transect at 25 points.

0150
0

J. SM

We can talk about nominal variables and continuous variables.

From our $250\text{m} \times 4\text{m} = 0.1\text{ha}$ sample we would like to derive these parameters for the contiguous patch of forest, that has been homogeneously delineated from the satellite imagery interpretation; and parameters for the vegetation type that that sample represents.

The vegetation types can be broadly listed

as :

low land evergreen & degradation
medium elevation evergreen
high elevation evergreen
sholas.

Moist deciduous forests.

Dry deciduous forest

Medium elevation scrub.

low elevation scrub

Riverine

With these, we ask the following questions:

1) Based on the sample, how do we estimate the parameters measured on the sample for the total population a) at the level of the patch and scale of the patch

b) at the level and scale of the vegetation type.

2) Since we have vegetation samples in the whole spectrum or universe of vegetation types of the Abitibi Biosphere Reserve,

b) What is the nature of distribution of these parameters of vegetation in general.

a) And more specifically what is the ~~Methodology~~ nature of ~~own~~ distribution of these parameters in the Nilgiri Biosphere Reserve.

Methodology:

a) Each sample analysis:

Each sample of $250\text{m} \times 4\text{m} = 0.1\text{ha}$ belt transect is constituted by 25 sub-samples of $10\text{m} \times 4\text{m}$ which are contiguous ~~or~~ along the belt.

The distribution of the parameters of the sample are studied from the value of the

parameters of the sub-samples. These values are thus used to estimate the means, the variances, skewness etc, etc, and other relevant "moments" of the distribution of these parameters. ~~These are then~~ ~~used~~ These statistics are then used to arrive ~~at~~ at the values of the parameters for the whole patch.

Here could use the sub-samples as independent units, contiguous units, step-wise moving units, aggregating units, mixed randomly picked units, and maybe units picked with specified distances between them like 1 and 6, 2 and 7, 3 and 8 . etc. . . and analyse to determine patterns in the parameters, and get

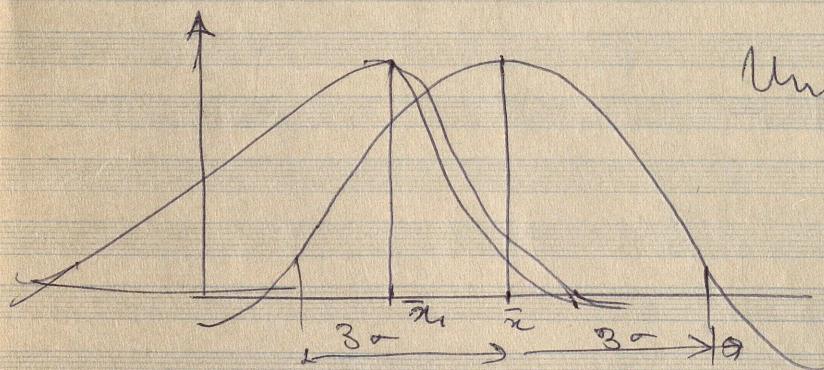
50028202160970900DGT--
50029202160970900G0A--
50030202160970900RTGYA
DGA--
DGTA-
G0TA-11S1RTYA
WT---
WA---
WTA--11S1GOT--13S1
RTDBA1RSARTLBATOWA-1RSAR TSA-

better estimates for these parameters for the
universe.

b)

The Multi hypothesis testing:

You have two parameters values of a parameter measured by the 'means'. Now, when the variance of the mean overlaps the mean of the other distribution, we cannot conclude that ~~on~~ ~~or~~ definitely on one of the hypothesis.



Unconclusion, : greater variances than the observed mean differences.

NBR

(A) The forests and their biological diversity.

Vegetation & floral

Wildlife & Fauna.

(B) Current Resource use patterns in the area.

Agriculture & Land Use

Livestock.

Gathering

Recreational & Educational.

(Industrial)

(C) Resource use unsustainable for maintenance of biological diversity: In each biophysical zones with case studies, with,

- some local perspectives of the problem.
- some remedial measures and scenarios of the problem
- discussions.

① Some Global Perspectives on the Problem. (1)

Sagor area:

Sagor plateau : Grazing
fire.

Wynnad Plateau : Poaching
fire

Encroachments : Pressure on land.
Deforestation
Spread of plantations & monocropping
Cultural swamping
Water balance.

Nilgiri Plateau

Tourism
Shola status
Plantations Forest.
Commercial plantations.
Tourism.

Coimbatore Plains : Water resource utilization
Human density & disturbances
Tourism options.

Shree Ramesh

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Dr. K. S. Krishnan Mang

New Delhi - 110012

Σ: 5729151 / : 0

5726406

6864670 : R

Send references on Ecological thought

1) Editing ~~no~~ NODES are poor.

2) ~~All the~~ All the commands must be remembered along with the sequence of commands required for a particular operation.

3) Going in and out of modules and commands are laborious, involving many steps.

EDIT - BUILD - PLOT - EDIT etc.
TABLES

4) STARTER KIT ADS can only work with a digitizer if COM-21G is given.

5) In the APPARECS menu, the 3) Run 4) Delete Vertex etc does not work.

6) Where are the AR AFT data set stored?

7) For many commands, there is no help available eg AREPLOT, MAKE

Vegetation Analysis.

Ref: Preston, F.W., Ecology 29, 254-283 (1948)

Species - Abundance Plots.

No. of Species. Vs. Abundance.
(Individuals per species)

↓
Normal.

↓
 \log_2

ie class intervals of

0

2

4

8

16

32

64

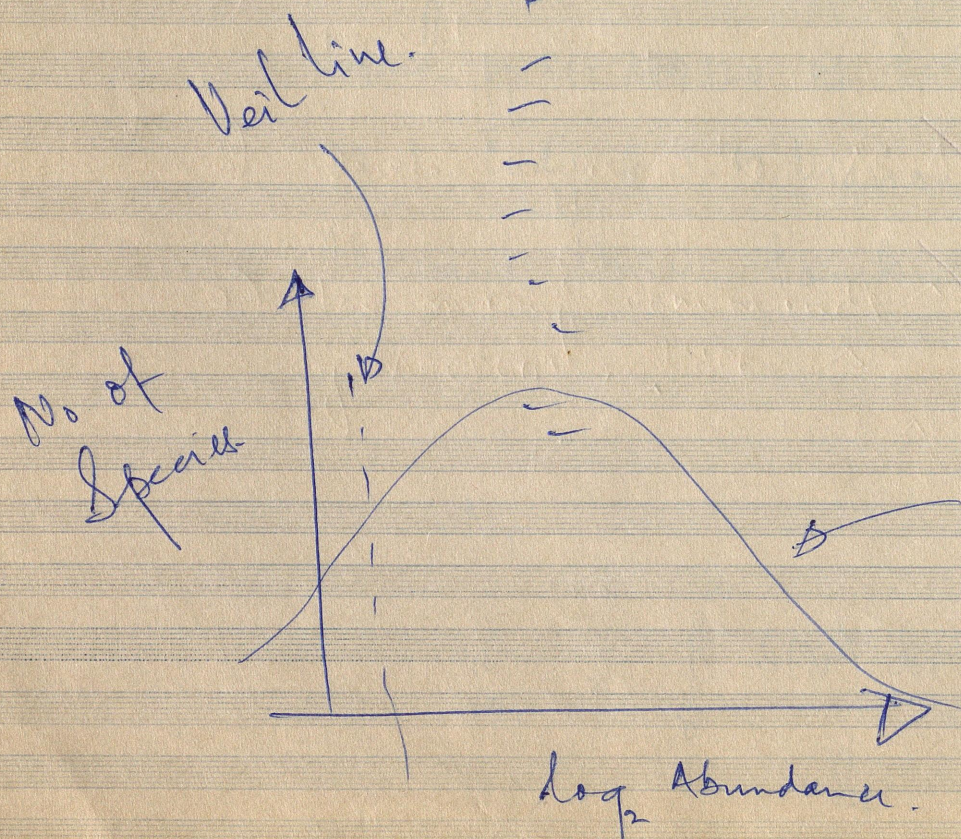
128

256

512

1024

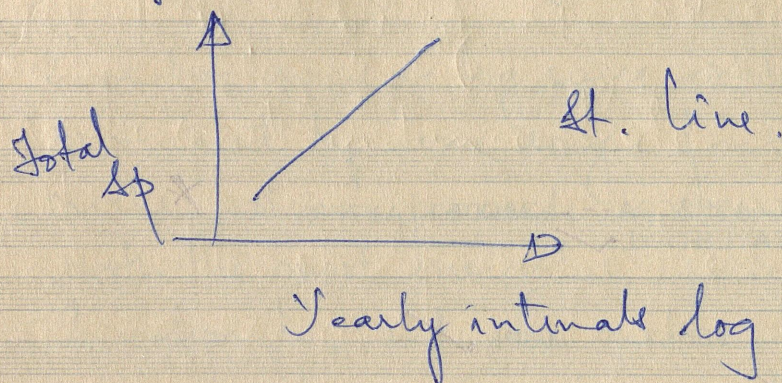
↓ etc



Normal distribution

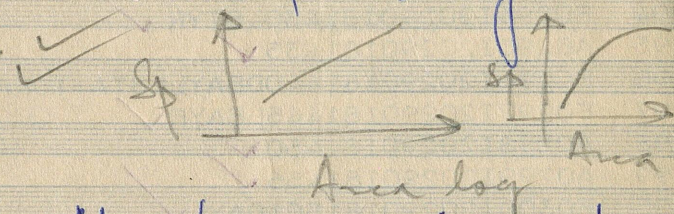
Estimate total no. of species in universe from ~~sp~~ plot sample assuming Normal dis of

If we plot the number of specimens in the collection on a natural scale, as ordinate, against the log. of the time of collecting as abscissa, we shall get a straight line.



i.e., Doubling the "period" of observation or doubling the sample, always adds a constant increment of new species.

(But is this not opposed to the flattening out of the species-area curve?)



Robert M. May, Patterns of Species Abundance & Diversity.
 from pp 81-120 of Ecology & Evolution of Communities
 M. L. Cody & J. M. Diamond, eds., Belknap Press,
 Harvard Univ., Cambridge, Mass., 1975. 545 p.

S_T

N_T

$$S_T = \int_0^{\infty} S(N) dN \quad ; \quad N_T = \int_0^N N S(N) dN$$

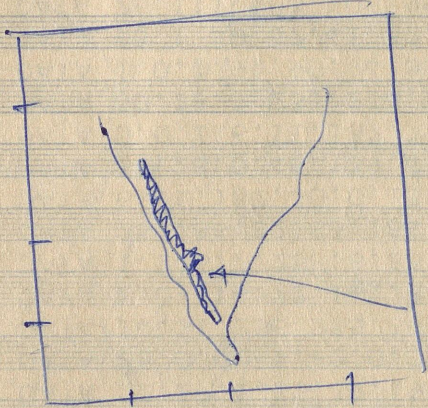
$$S_T \gg 1.$$

Broken-stick: when an ecologically homogeneous group of species apportion randomly among themselves a fixed amount of governing resource. (MacArthur, 1957, 1960)

Geometric-series or log series distribution: If a community is dominated by some single factor, and if division of their niche volume proceeds in strongly hierarchical fashion with the most successful species tending to preempt a fraction k , and the next a fraction k of the remainder etc, we arrive at a geometric series distn. or log series distn. as a statistically realistic expression

log-normal reflects the statistical Central Limit Theorem;

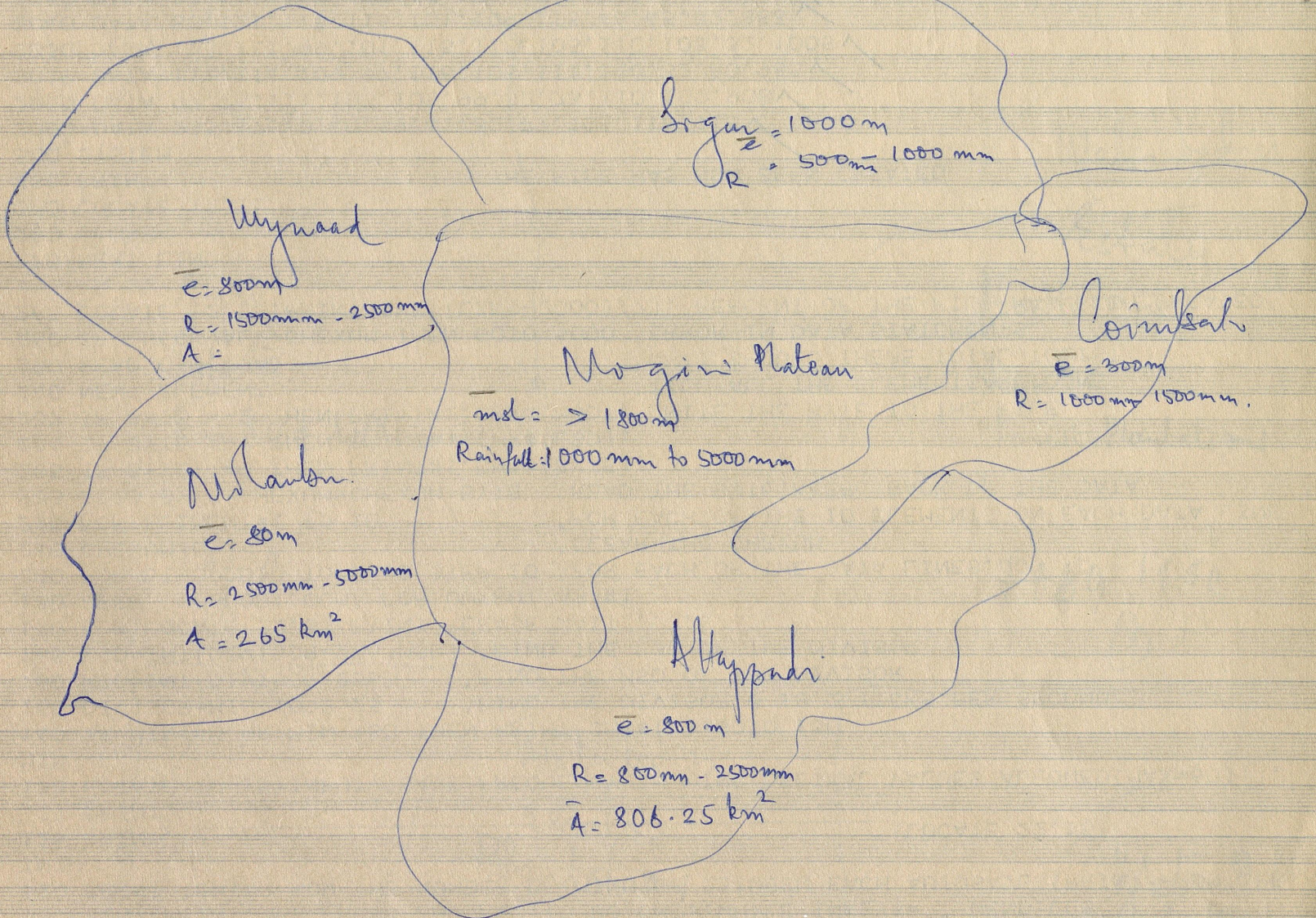
location map
Inset.



Geo-physical Zone

Palghat Gap

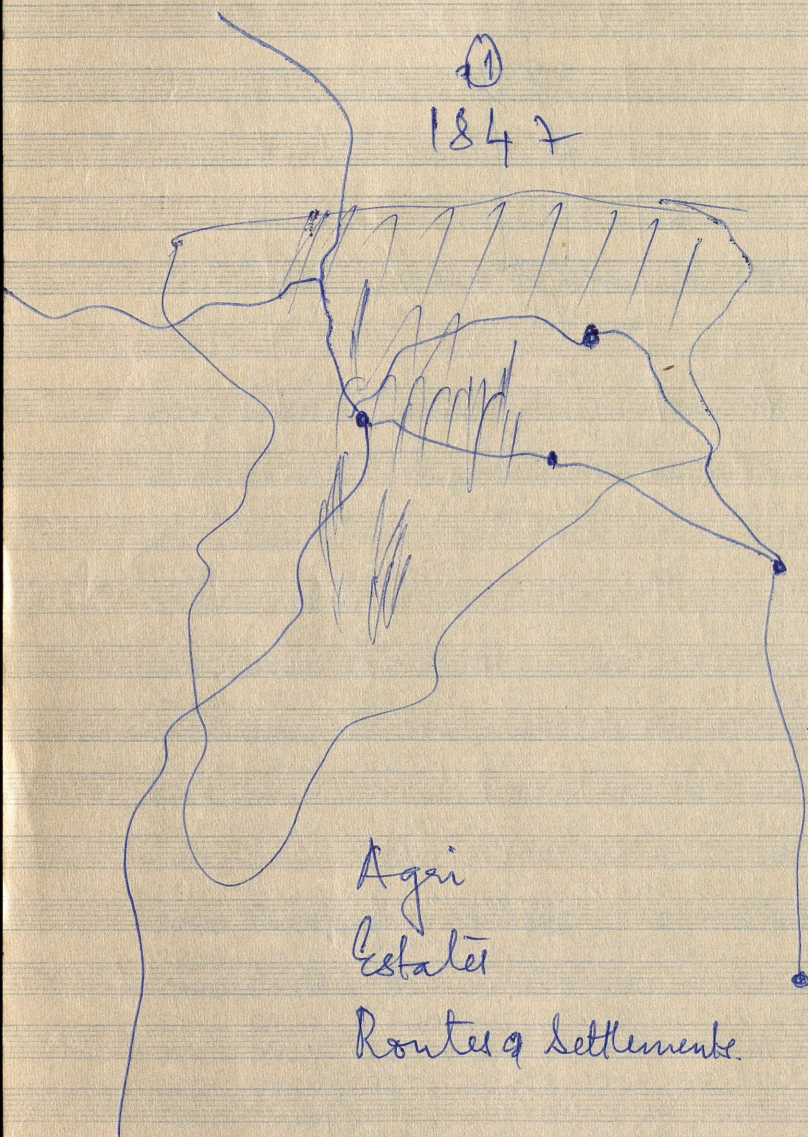
Wayan Gorge - R.



NILGIRI PLATEAU. 1847 - 1989

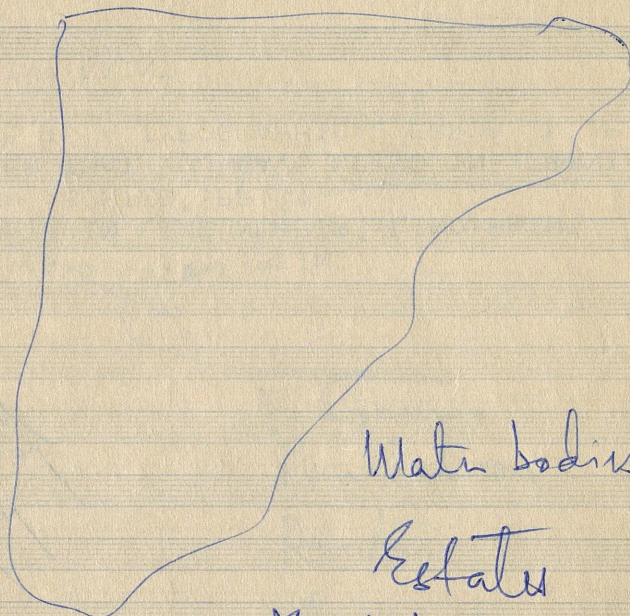
Draw the scale
in the original
before photocopy

①
1847



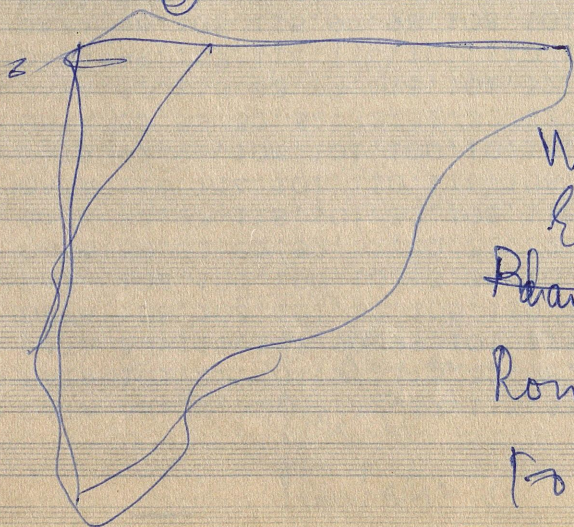
Agni
Estate
Routes & Settlements.

1908
②



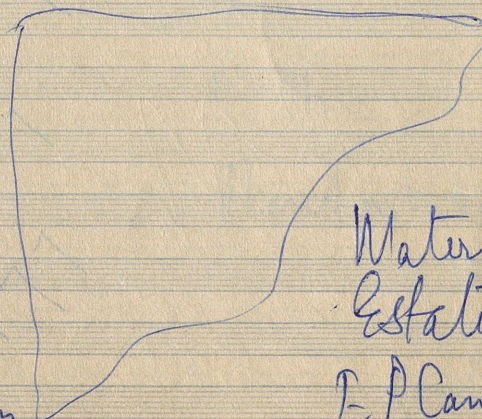
Water bodies.
Estate
~~Plantations.~~
Routes
Forest Plantations.

1954
③



Water bodies
Estate
~~Plantations~~
Routes
Forest Plantations

1989 1990
④



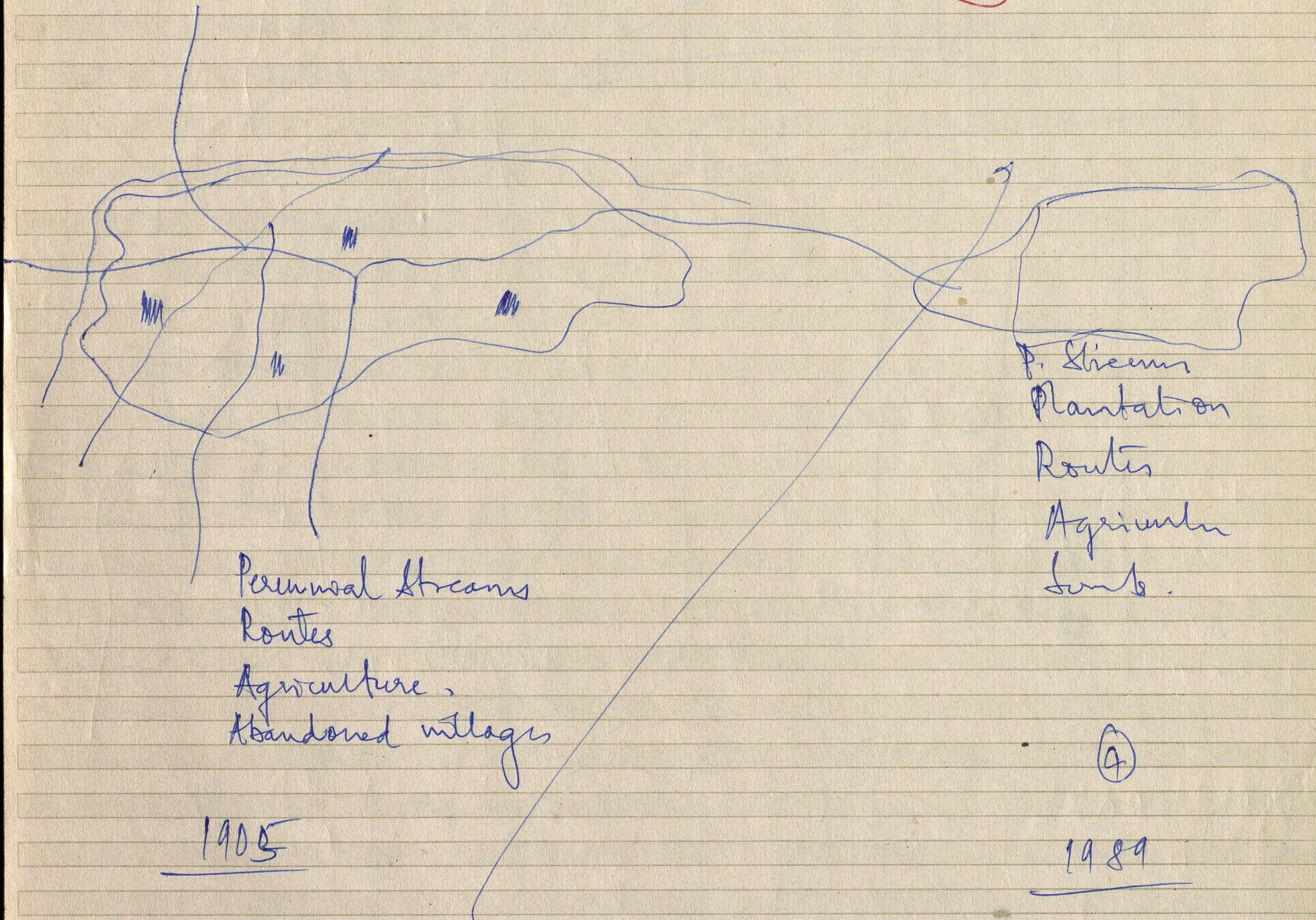
Water Bodies
Estate
P.P. Plantations
Settlements

SIGUR PLATEAU

Scale before reduction (2)

1822

1954



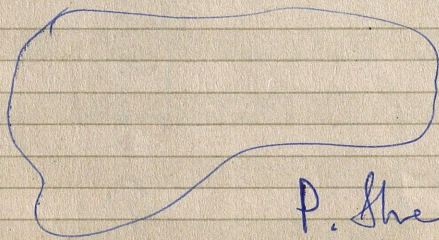
Perennial Streams
Routes
Agriculture
Abandoned villages

P. Streams
Plantation
Routes
Agriculture
Scrub.

(4)

1905

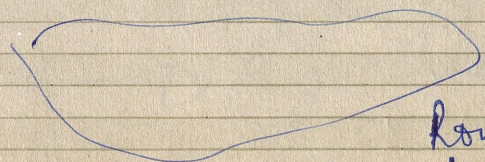
1989



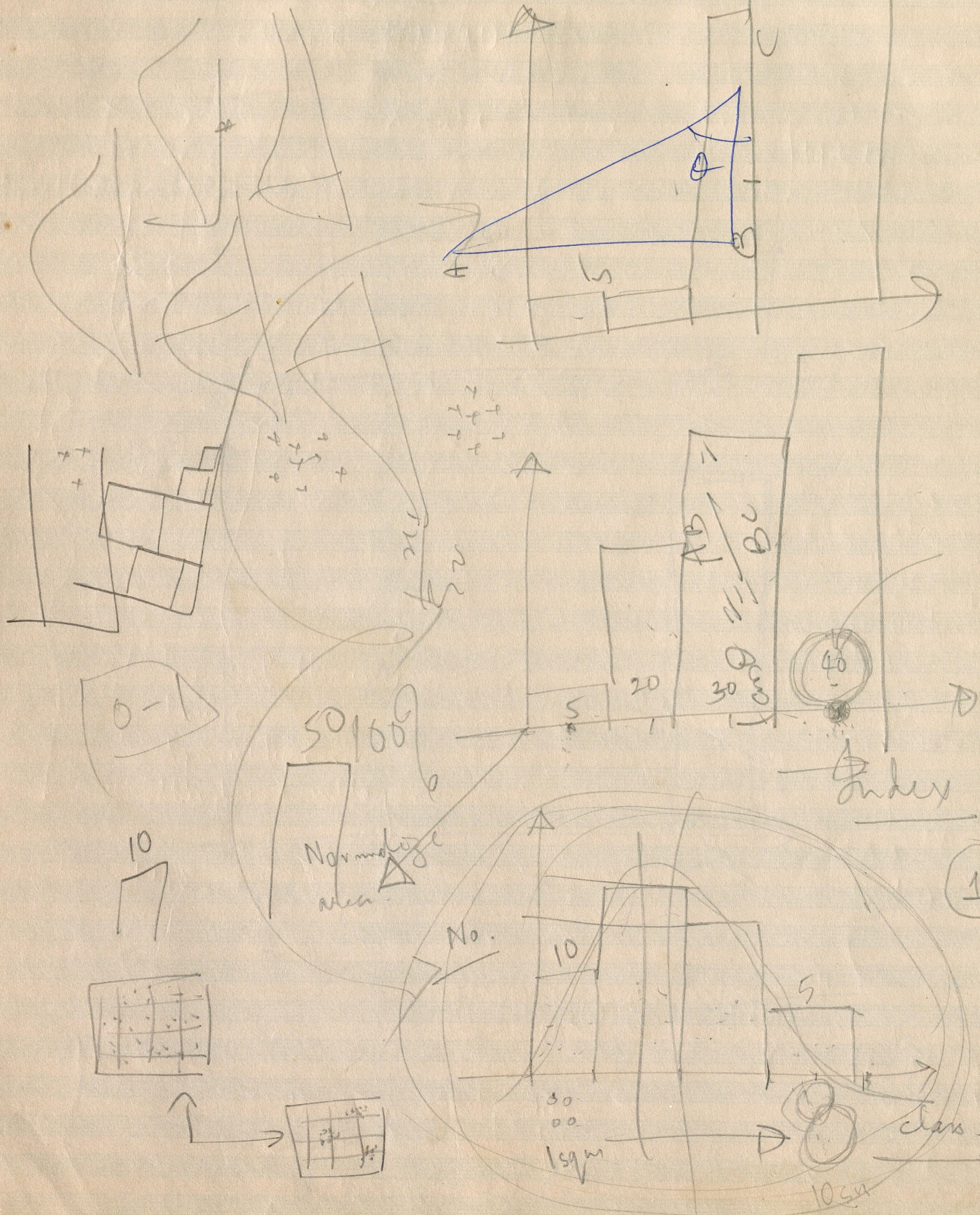
P. Streams
Routes
Plantations.

Agriculture
Scrub.

P. Stream
Plantations

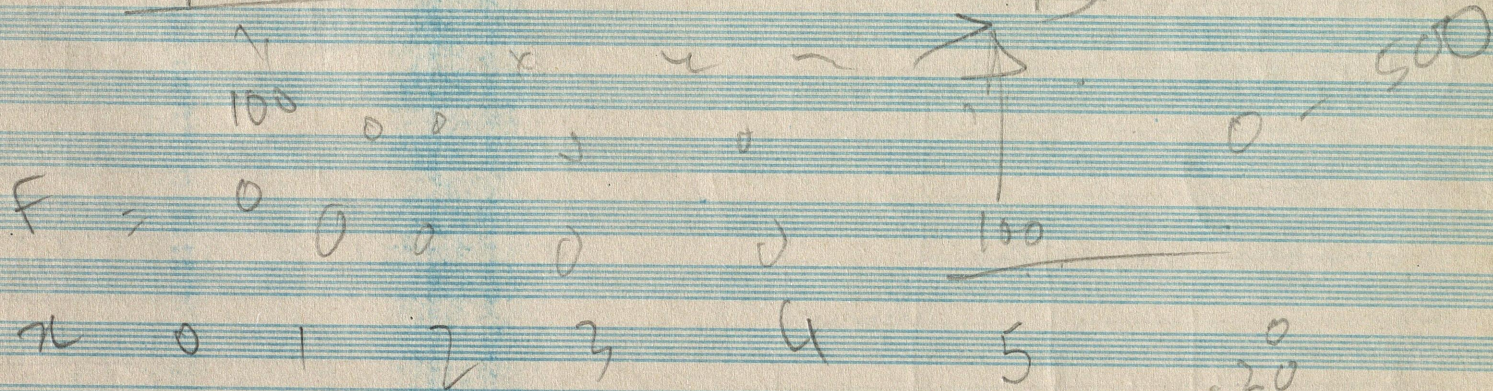
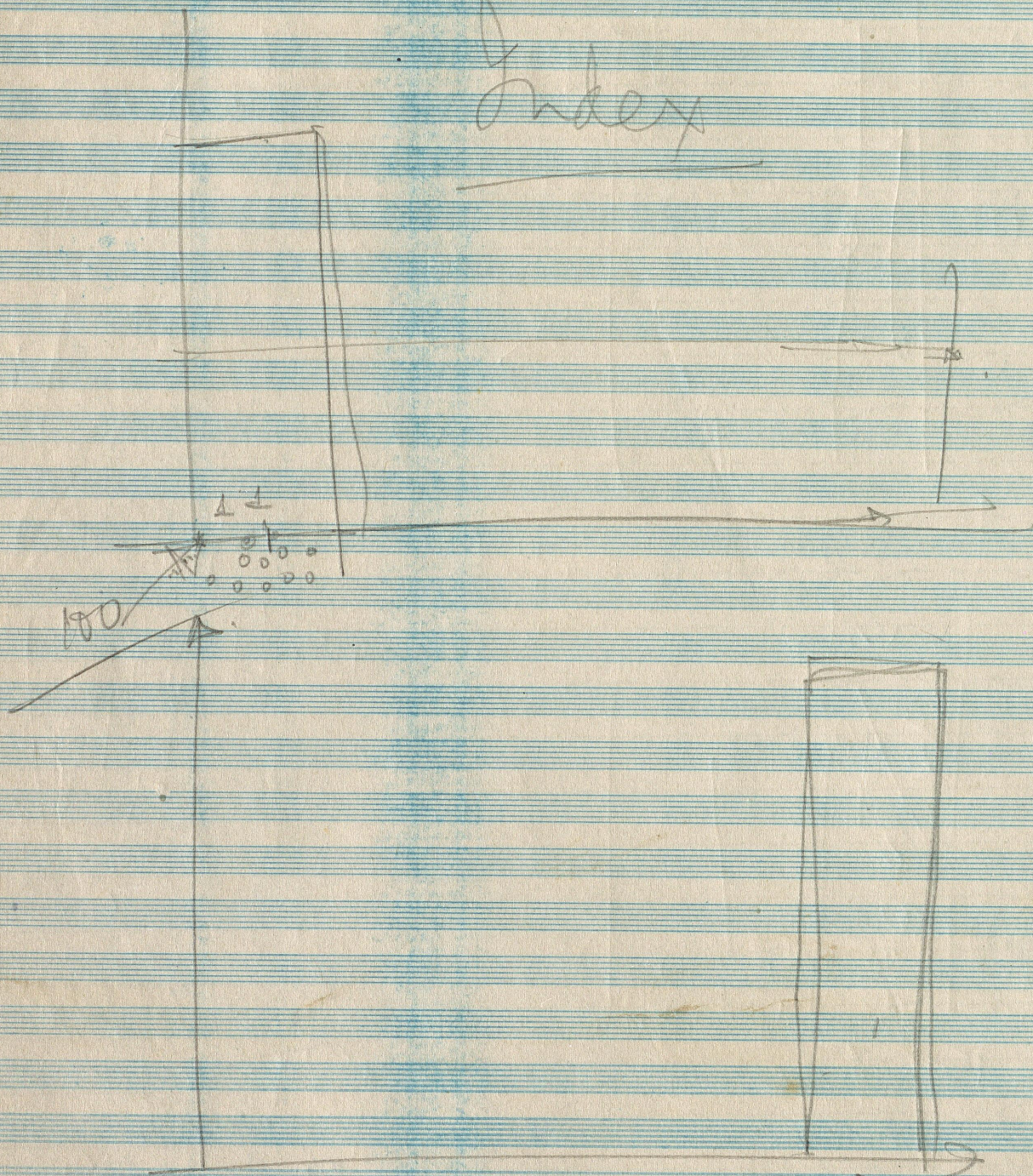


Routes
Agriculture



1

Index



$$\sum f_{rc} = 0$$

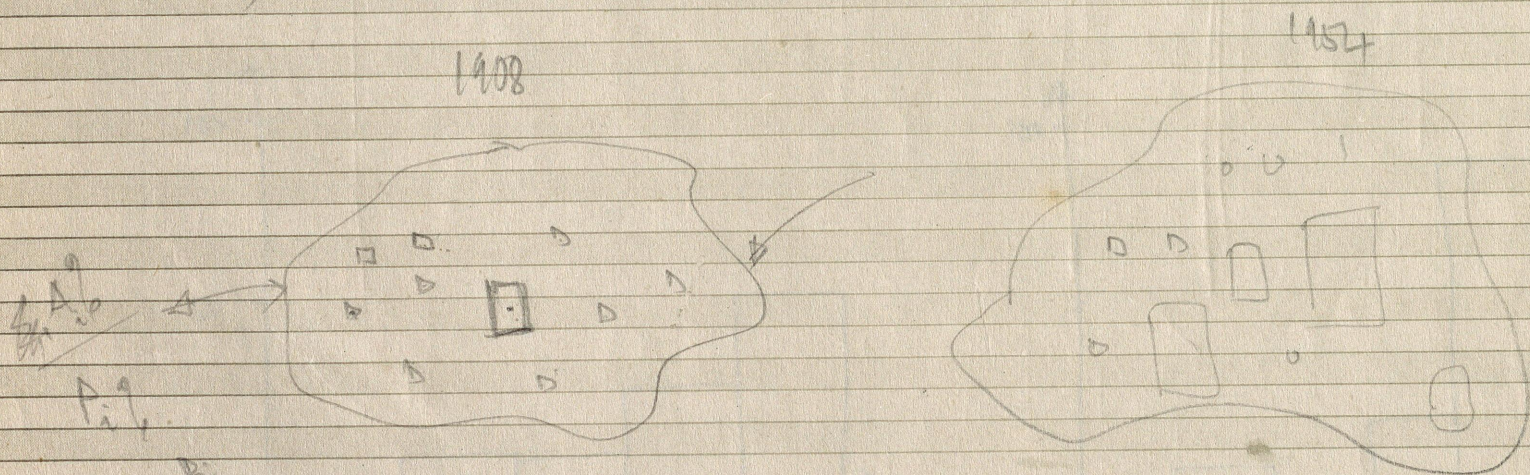
$$\sum S_{rc} = 500 / 500$$

3/5

- 0
- .20
- 40
- 60
- 80
- 100

0 - 0.1	31.4 % area	3	$\frac{31.4}{25}$	$\frac{4.6}{54}$	$\frac{0.2}{9}$	$\frac{1}{36}$
0.1 - 1.0	% patches		$\frac{58.1}{25}$	$\frac{12.3}{32}$	$\frac{9.7}{64}$	$\frac{3.5}{45}$
1.0 - 5.0			0	$\frac{28.2}{11}$	$\frac{5.3}{9}$	0
5.0 - 10.0			0	$\frac{55.2}{3}$	$\frac{29.7}{9}$	$\frac{21.7}{9}$
> 10.0			0	0	$\frac{55.1}{9}$	$\frac{73.8}{9}$

all,

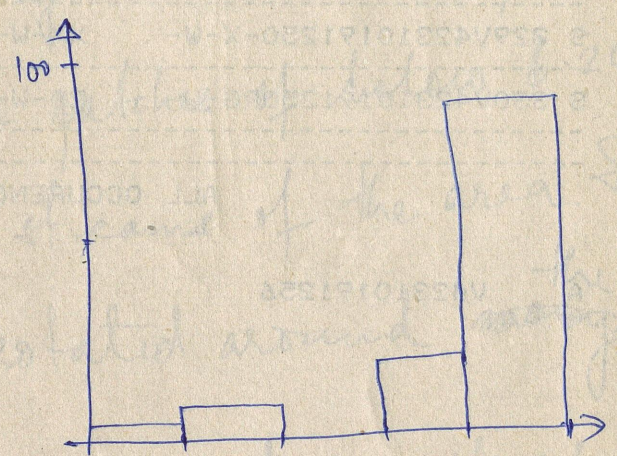
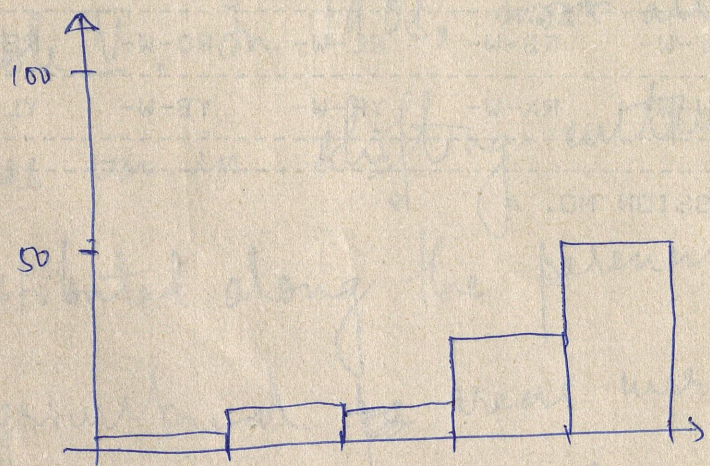
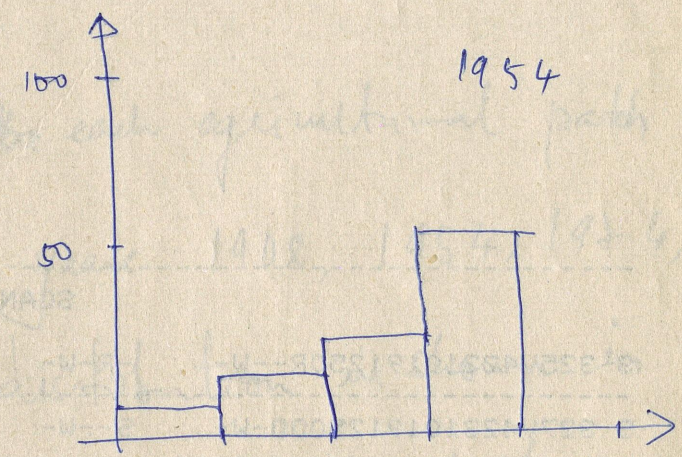
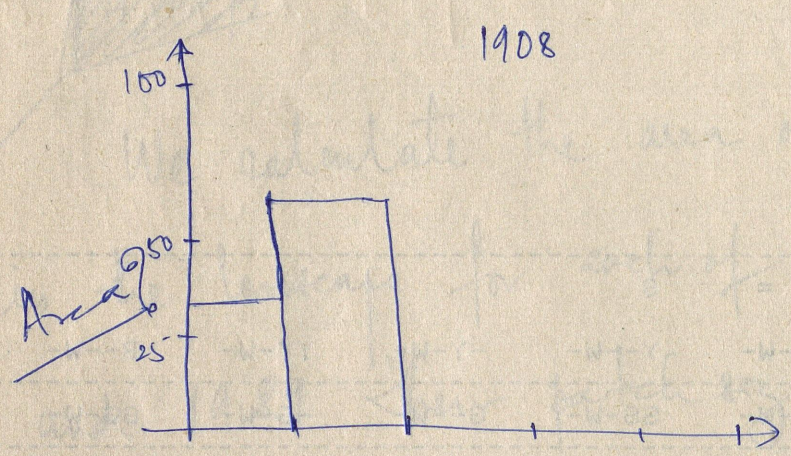


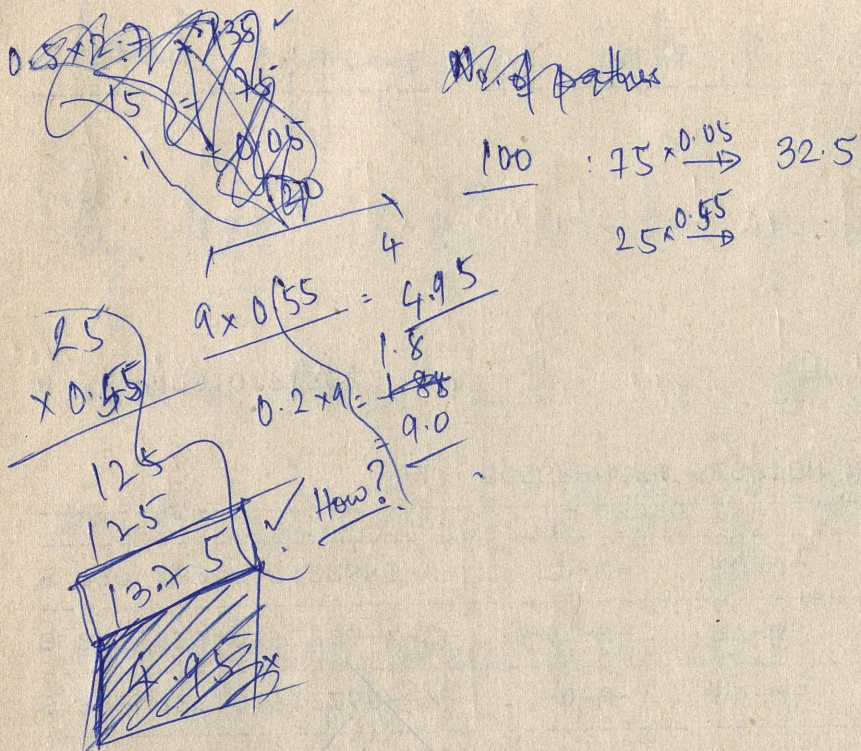
$$\frac{A_i}{P_i} + \frac{P_i}{A_i}$$

Summate over the area/perimeter ratios for each

landscape?

I want to catch this patch aggregation index
 in number so I can translate across bio-physical
 zones.





We calculate the area of ~~the~~ each agricultural patch in the landscape for each of the years 1908, 1954, 1974, and 1989. Their patch size distribution is shown in Table V. In 1908, most all ^{the} agricultural ~~activities~~ was in shifting cultivation patches of below 6.25 km^2 distributed along the perennial streams of the area. The agricultural ~~to~~ areas were rotated around ^{the} ~~margin~~ favorable sites. By 1954, immigrant agriculturists from the Coimbatore plains had ^{permanently} settled in the Bhavani valley with 50% 55.2% of the

land aggregated into a large patch of ~~to~~ 62 sq km.

By 1989, 73.8% of the agricultural land was aggregated into a large patch of ~~18~~ 110 sq km, and the small subsistence shifting cultivation ~~the~~ patches of the indigenous population only occupied 1% of the total agricultural area.

Map # shows

Summary &

Conclusions :

The Nilgiri area had been a ~~tribal enclave~~ low population density tribal enclave during the pre-colonial period. It supported a wide spectrum of communities from hunting-gathering & pastoral communities to subsistence agricultural ^{and artisanal} communities. These communities interacted among themselves in exchanges of goods and services. The area also had ^{cultural} links with the larger Southern Indian civilization, as ~~many important~~ as it was the ~~trifunction~~ ^{trifunction} between ~~and had~~ the Tamil plains, Wynad and the Mysore plateau, and with many routes ^{trade & communication} ~~passed~~ ^{passing} through the ~~low~~ ^{lower} Nilgiri plateau. However there was no large-scale export of resources from the area, other than certain special ~~uses~~ ^{uses} like the British gained control of the area forest produce like medicines, honey etc. after the fall of Tipu in 1799. Their early attempts were to consolidate their control over the area. They discovered the cool climate of the Nilgiri plateau, and concerted efforts were made ~~by opening soon~~ to establish a European colony.

on the hills. Townships and cantonments were established; routes were laid to the hills from the surrounding plains; agricultural stations were established to experiment and acclimatise temperate plants; and immigration was encouraged to provide the necessary services. Consequently agriculture expanded on the Nilgiri plateau. The surrounding plateau and plains were relatively undisturbed during the first phase of colonial rule. *

~~During the second phase of colonial rule, from 1850 to 1905,~~ ^{By 1905, By 1905} settlements and communications expanded all over the Nilgiri plateau Nilgiri area. ^{and expansion} With the establishment of tea and coffee plantation, commercialisation spread ~~into~~ ^{into} the all over the Nilgiri plateau. With this settlements and immigrant population increased

By 1905, ~~large areas in the western~~ coffee and tea had established itself as a significant commercial crop. Large areas ~~in~~ on the Nilgiri plateau and the Wynad plateau were cleared of natural vegetation and commercially exploited with tea and coffee plantations. ^{integrating the area with the global market} The remaining natural forests ~~on~~ on the Nilgiri ^{plateau} hills were legally 'reserved' ^{for their aesthetic appeal to the colonialists, whereas} to ~~preserve the beauty of the hills and~~ the forests with valuable timber species in the Wynad and Sagar plateau were reserved for commercial exploitation. The depauperisation of surrounding areas in the Coimbatore plains and Mysore, ^{during the Famine of 1897} provided the much needed immigrant labour force for commercialisation of the Nilgiri plateau.

By 1950s, the favourable areas in the Nilgiri plateau, ~~and the Wynad~~ were completed converted to ~~tea~~ ^{and coffee} commercial tea/coffee plantations, along with this communication networks ~~expanded to~~ and settlements ~~spring~~ expanded in these

area. In the lower plateaus, a network of roads were laid selectively into areas that had commercial timber. In other areas agriculture expanded along with the entry of immigrants from the surrounding areas.

ECOLOGICAL SITUATION IN THE NILGIRI BIOSPHERE RESERVE

Objectives of the NBR:

1. Conservation of bio-diversity: large mammals; vegetational diversity; endemism

Advantages of the site: ~~biological~~

2. Conservation of cultivars: tribal culture & modes of resource use: cultivars; gathering; ~~livestock rearing or pastoral~~

3. Integrating the objectives of conservation & Development. Sustainable Development.

Research & Database status

- a) List of vertebrate flora for NBR
by Dr. R. J. R. D.
- b) List of trees of the NBR.
- c) ~~To~~ Vegetation and Landuse mapping
at the scale of 1:10,000 through
visual interpretation of satellite
imageries. ~~And attempts~~
- d) Attempts at creating a Geographical
Information system for the NBR.

e) Long-term monitoring of vegetation
of ~~the~~ deciduous forests in Mudumalai
WLS since 1988.

f) Monitoring of fire in the Mudumalai
WLS ~~since~~ 1988. by a fire map since
1988.

g) NBR literature collection.

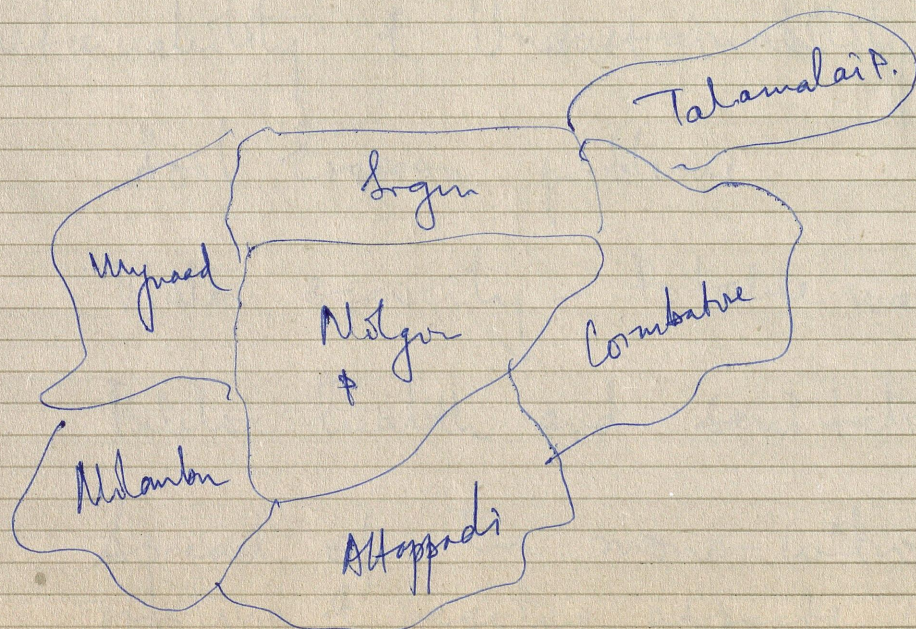
h) Monitoring wildlife populations in the Mudumalai
WLS. and other Wildlife Biology Studies.
Research

i) Institutions active in the NBR.

‡ CES, IITC
BNHS
Coop Bank.

The Bio-physical zones of the Nilgiri Biosphere Reserve.

1. Nilgiri plateau
2. Sengur plateau & Talamalai Plateau
3. Wynad plateau
4. Nilambur plains
5. Athappadi plateau
6. The Coimbatore plains.



State of

Ecological situation in each bio-physical zone.

A. The Nilgiri plateau.

Shola - grassland.

Sambhar - Taluk. - ~~Bison~~ or Gaur -
leopards - BNH - Wild boar - Jackals -
Wild dogs - Primates - Nilgiri langur & LTM.

Agriculture. vegetable cultivation
Food grain cultivation

Plantations : Tea - Coffee

Forest Plantations : Wattle - Eucalyptus.

Sustainability & Unsustainability.

Soil Erosion problems

Water scarcity - Potable water.

Public health and sanitation problems.

Spread of tea mono-culture : its
positive & negative aspects : cost/benefit

Food conservation programme has been wound-up.
why?

analysis -

Economic benefit to owner.
Vegetational cover & Carbon sequestrating.
? Problems of clonal mono-culture.
Dependence of the tea market, and
seems to be stable after domestic
demand (Tea as an essential commodity)

Conflicts with conservation of natural
vegetation

~~Patterns of expansion by wild pigs.~~
land use and

Unsustainable practices of agriculture - vegetable
cropping and tea cultivation of steep slopes.

Unplanned and ad hoc plantation forestry
operations.

Threat to grassland ecosystems from
fire and spread of plantation forestry.

Tourism options in the Mubarti WLS.

Drinking water & sanitation problems in
villages and hamlets.

Animal distributions in the Nilgiri plateau &
conflicts: Wild pigs; panthers;
decreasing in Tiger numbers.
Sambar increasing densities?
Seasonal elephant utilization.

B. Sogur Plateau:

Dry deciduous - Thorny scrub - Savannas
Tree & shrub savanna.

Habitat for mammals. Elephant - Gaur -
Chital - Sambar - Barking Deer - etc. - Black
buck - Boab - Panther - Tiger - Wild dogs -
Jackals - Hyenas.

Recreation &
Tourism

Pockets of Agriculture.

Animal husbandry / livestock. Domestic

Sustainability & Unsustainability:

Cattle
Mugubi 3,500
Moga 4,500.

Sogur 15,000.

SL:

1	0.0000
2	0.0000
3	0.0000
4	0.0000
5	0.0000
6	0.0000
7	0.0000
8	0.0000
9	0.0000
10	0.0000
11	0.0000
12	0.0000
13	0.0000
14	0.0000
15	0.0000
16	0.0000
17	0.0000
18	0.0000
19	0.0000
20	0.0000
21	0.0000
22	0.0000
23	0.0000
24	0.0000
25	0.0000
26	0.0000
27	0.0000
28	0.0000
29	0.0000
30	0.0000
31	0.0000
32	0.0000
33	0.0000
34	0.0000
35	0.0000
36	0.0000
37	0.0000
38	0.0000
39	0.0000
40	0.0000
41	0.0000
42	0.0000
43	0.0000
44	0.0000
45	0.0000
46	0.0000
47	0.0000
48	0.0000
49	0.0000
50	0.0000

This table gives distances and their standard errors
 Estimated from the following data
 1. 1.0000
 2. 1.0000
 3. 1.0000
 4. 1.0000
 5. 1.0000
 6. 1.0000
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 10. 1.0000
 11. 1.0000
 12. 1.0000
 13. 1.0000
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 48. 1.0000
 49. 1.0000
 50. 1.0000

