Conservation Prioritization of Forest Communities and Species in the Tropical Dry Forest Area of the Central Dry Zone, Myanmar

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YNU

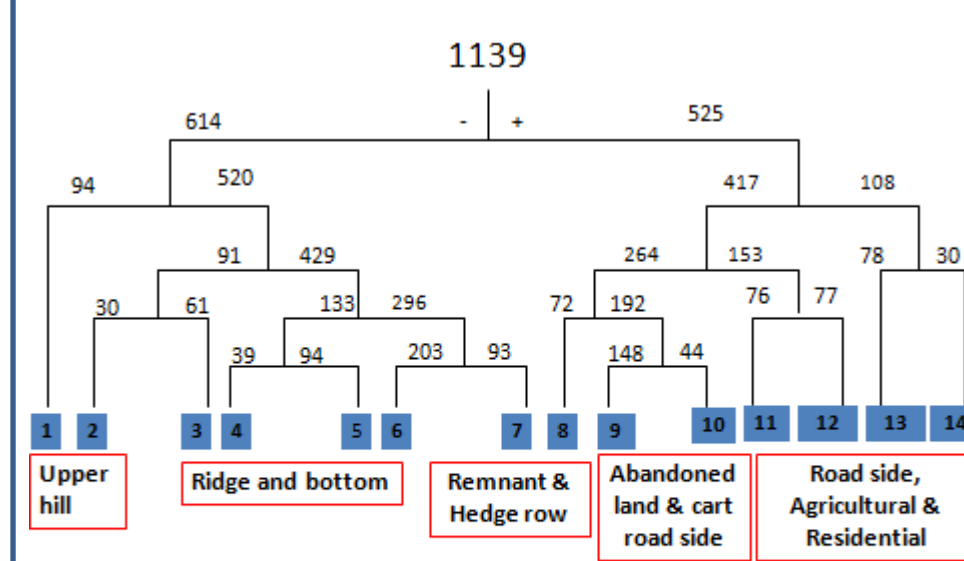ISAP 2013 International Forum for Sustainable Asia and the Pacific

Introduction

Tropical dry forests (TDF)

➢TDF are distributed throughout the tropical region (Mooney *et al*., 1995) and are more threatened, less protected and susceptible to deforestation than tropical rain forests (Murphy & Lugo, 1986; Bullock *et al*., 1995).

➢Protection of TDF have received less attention than rain forest from researchers and conservation projects. (Bullock *et al*., 1995).

Dry forest in Myanmar and data deficit condition

➢Dry forest in Myanmar has been disturbed over many years ago.

➢Many reforestation, restoration and rehabilitation activities have been carried out for dry forest conservation, but, which vegetation community and species should be given priority for conservation is still a problem due to limited resources for research and data.
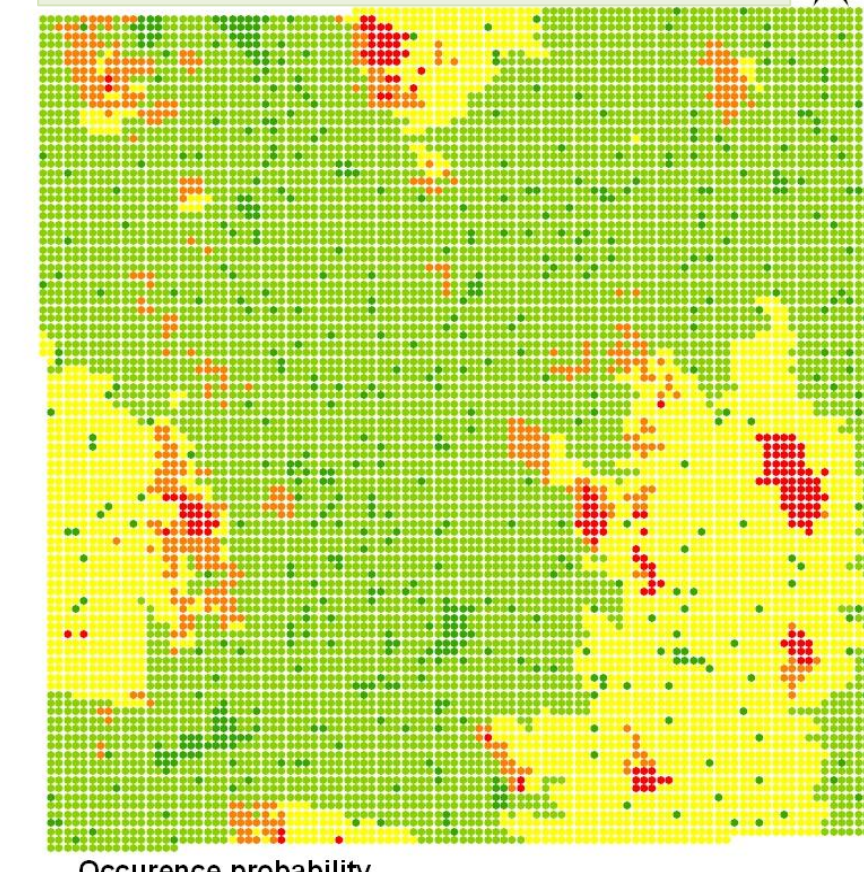
Objective

➢Develop the conservation prioritization procedure by the feasible effort of field-survey under data deficit condition

➢Apply this procedure to know prioritized community types and species in the tropical dry forest in Myanmar

Methodology

Vegetation Survey in the target area (Presence/ Absence)

Classification of vegetation types by **TWINSPAN** (Hill,1979) with **CHI squared test**

1. Modeling of each community type
2. Predictive Vegetation maps based on model predictors at community-level modeling

Identify typically occurring species (indicator species)

Communities to be conserved based on decision procedure

Species to be conserved: Typical species for rare community [community specificity x rarity]

Study Area

Study Area (100 km * 100km)

Location Map of Myanmar

Location Map of Dryzone Areas in Myanmar

Sample site allocation

- Locate100km x 100km study area
- Randomly laid out 1139 plots of 15m X 15m

Vegetation Survey

- **Presence/Absence** survey of all vascular species in each sample plot

LEGEND
Good Forest
Degraded Forest
Shifting Cultivation
Agriculture
Other
Water

Result

Predictive distribution map for Community type 1

1139
614 | - | + | 525
94 | 520 | 417 | 108
91 | 429 | 264 | 153 | 78 | 30
30 | 61 | 133 | 296 | 72 | 192 | 76 | 77
39 | 74 | 203 | 93 | 148 | 44
1 2 | 3 4 | 5 6 | 7 8 9 | 10 | 11 12 | 13 | 14
Upper hill | Ridge and bottom | Remnant & Hedge row | Abandoned land & cart road side | Road side, Agricultural & Residential

14 types were classified
330 species were recorded

$$Y = \frac{1}{1+e^{(-(B_0+B_1X_1+B_2X_2+...+B_nX_n))}}$$

Occurence probability finalanalysis Commut1
■ 0.000000
■ 0.000001 - 0.004327
■ 0.004328 - 0.061320
■ 0.061321 - 0.185960
■ 0.185961 - 0.403471
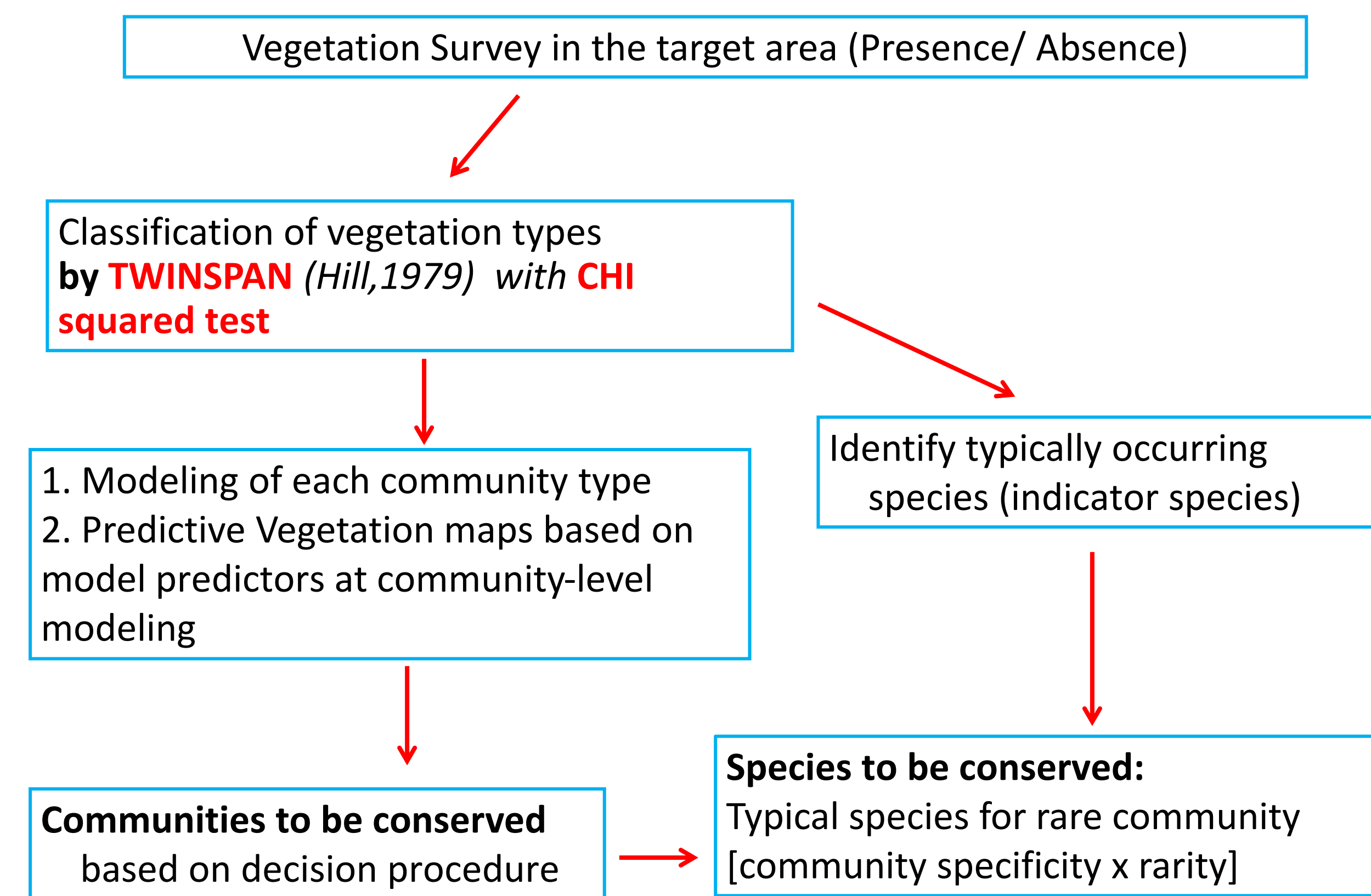
Response variables - **target plant community types**
Predictor variables - **Elevation, Inclination, Curvature, Radiation, Catchment Area, Water Flood** (From GTOPO 30) and **Land use** (Forest, Agriculture and Residential Area)

➢Predictive distribution maps (1km * 1km mesh for 14 community types are produced in the Arc GIS 9.3.1
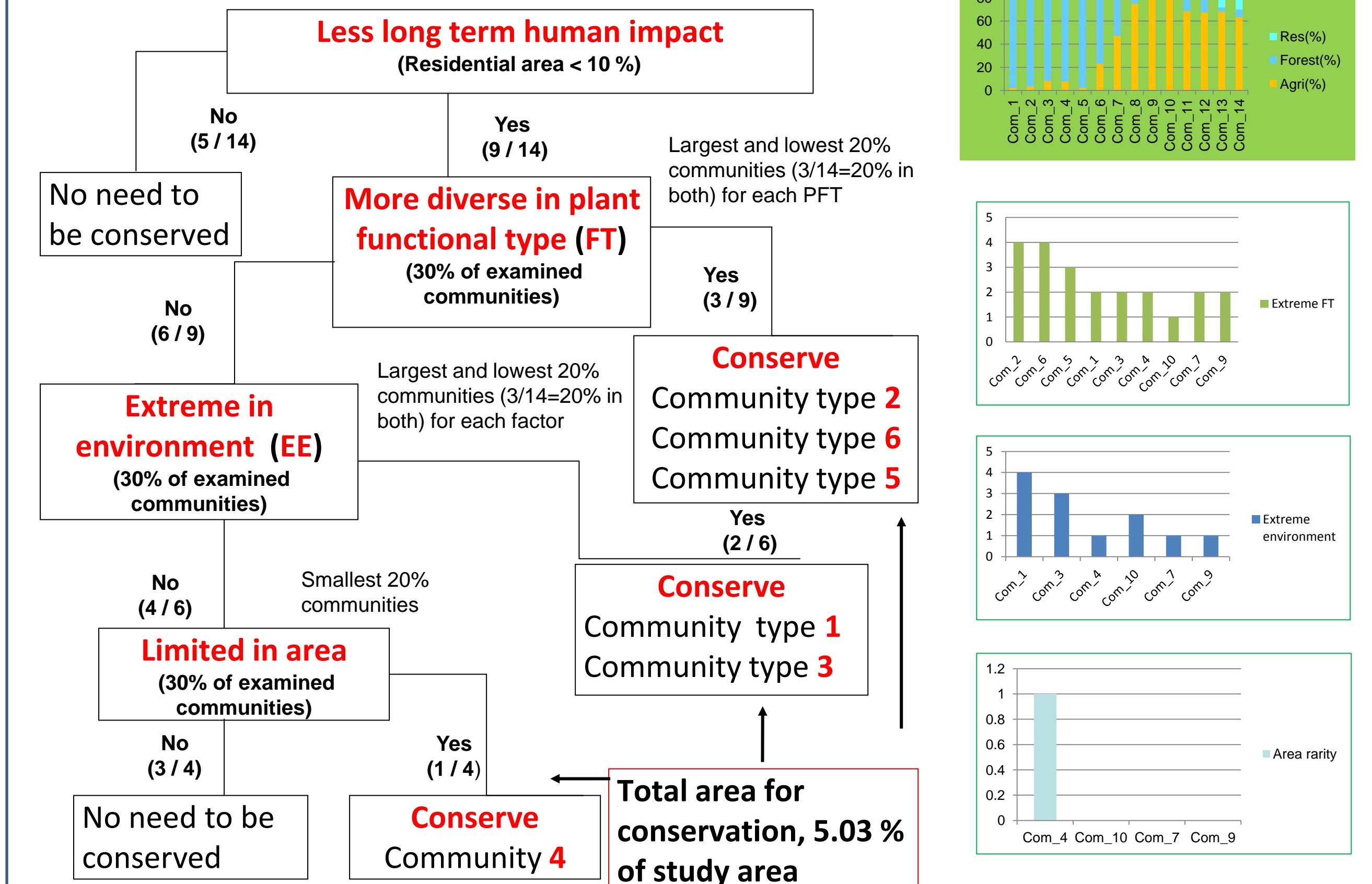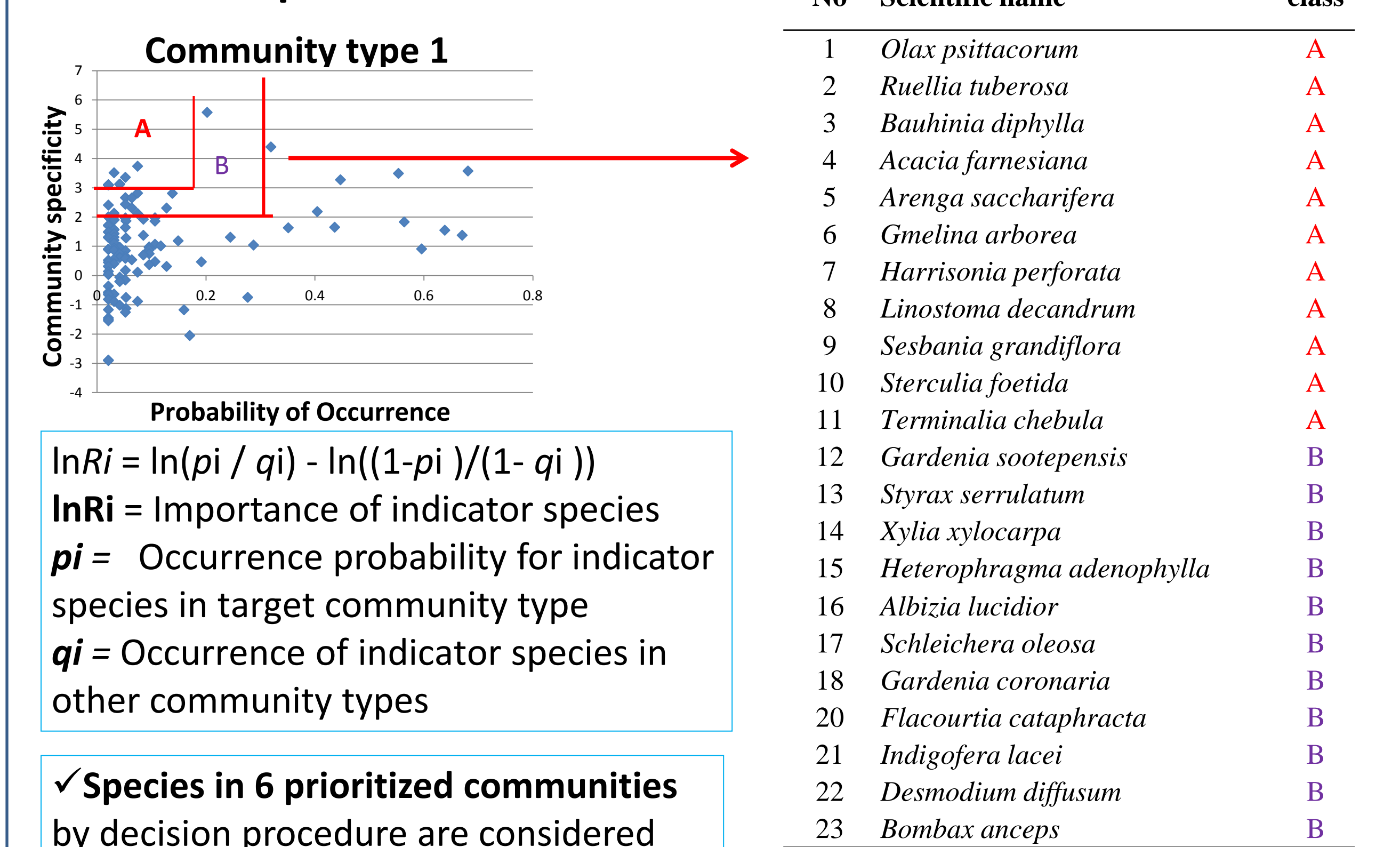➢Area for 14 community types are calculated from predicted maps modeling

Prioritized community types for conservation

Less long term human impact
(Residential area < 10 %)

No (5 / 14) — Yes (9 / 14)

No need to be conserved

More diverse in plant functional type (FT)
(30% of examined communities)

No (6 / 9) — Yes (3 / 9)

Largest and lowest 20% communities (3/14=20% in both) for each PFT

Extreme in environment (EE)
(30% of examined communities)

Conserve
Community type 2
Community type 6
Community type 5

Largest and lowest 20% communities (3/14=20% in both) for each factor

Yes (2 / 6)

Conserve
Community type 1
Community type 3

No (4 / 6) — Smallest 20% communities

Limited in area
(30% of examined communities)

No (3 / 4) — Yes (1 / 4)

No need to be conserved

Conserve Community 4

Total area for conservation, 5.03 % of study area

Prioritized species for conservation

Community type 1

$$\ln Ri = \ln(pi / qi) - \ln((1-pi)/(1-qi))$$

lnRi = Importance of indicator species
pi = Occurrence probability for indicator species in target community type
qi = Occurrence of indicator species in other community types

✓**Species in 6 prioritized communities** by decision procedure are considered

➢79 prioritized species for conservation - group A (38 species) and group B (41 species) in 6 prioritized communities are identified

No	Scientific name	class
1	*Olax psittacorum*	A
2	*Ruellia tuberosa*	A
3	*Bauhinia diphylla*	A
4	*Acacia farnesiana*	A
5	*Arenga saccharifera*	A
6	*Gmelina arborea*	A
7	*Harrisonia perforata*	A
8	*Linostoma decandrum*	A
9	*Sesbania grandiflora*	A
10	*Sterculia foetida*	A
11	*Terminalia chebula*	A
12	*Gardenia sootepensis*	B
13	*Styrax serrulatum*	B
14	*Xylia xylocarpa*	B
15	*Heterophragma adenophylla*	B
16	*Albizia lucidior*	B
17	*Schleichera oleosa*	B
18	*Gardenia coronaria*	B
20	*Flacourtia cataphracta*	B
21	*Indigofera lacei*	B
22	*Desmodium diffusum*	B
23	*Bombax anceps*	B

Discussion and Conclusion

➢Ecologically important 6 Community types and 79 rare indicator species were prioritized for conservation.

➢Prioritized vegetation types detected in this study corresponds to local experts' judgment and prioritized species are partially supported.

➢My research findings will contribute to the conservation of dry forest in Myanmar and the proposed method will be applicable to other countries under data deficit condition on regional biological diversity.

➢Future research should focus to find out the favorite and focal species economically important for local people in the dry zone.

Ref: Bullock, S.H., Mooney, H.A., and Medina, E., 1995. Seasonally dry tropical forests. Cambridge University Press, Cambridge, United Kingdom
Arponen. A., Moilanen. A., Ferrier S., 2008. A successful community-level strategy for conservation prioritization. *Journal of Applied Ecology,* 45, 1436-1445