

Biodiversity platforms for green campus: Limitations of **Bottom-up ? Top-Down ?** Approaches

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Joint Symposium Mahidol-Macquarie Universities
26 July 2019, Fac of Sc, Mahidol Univ (K102) (0900-1400)

**Extended from
Urban Biodiversity, Education & New Ecologists**

**Joint Symposium on "Frontier Research in Biodiversity and Agricultural Resources"
6-7 Nov 2014, Fac of Sc, Mahidol Univ**

+

**Explore Roles of Campus Biodiversity to
transformative Education
Through bottom-up & Top-down Approaches
in 2015-2019**

Increasing in urbanized population over rural population is obvious

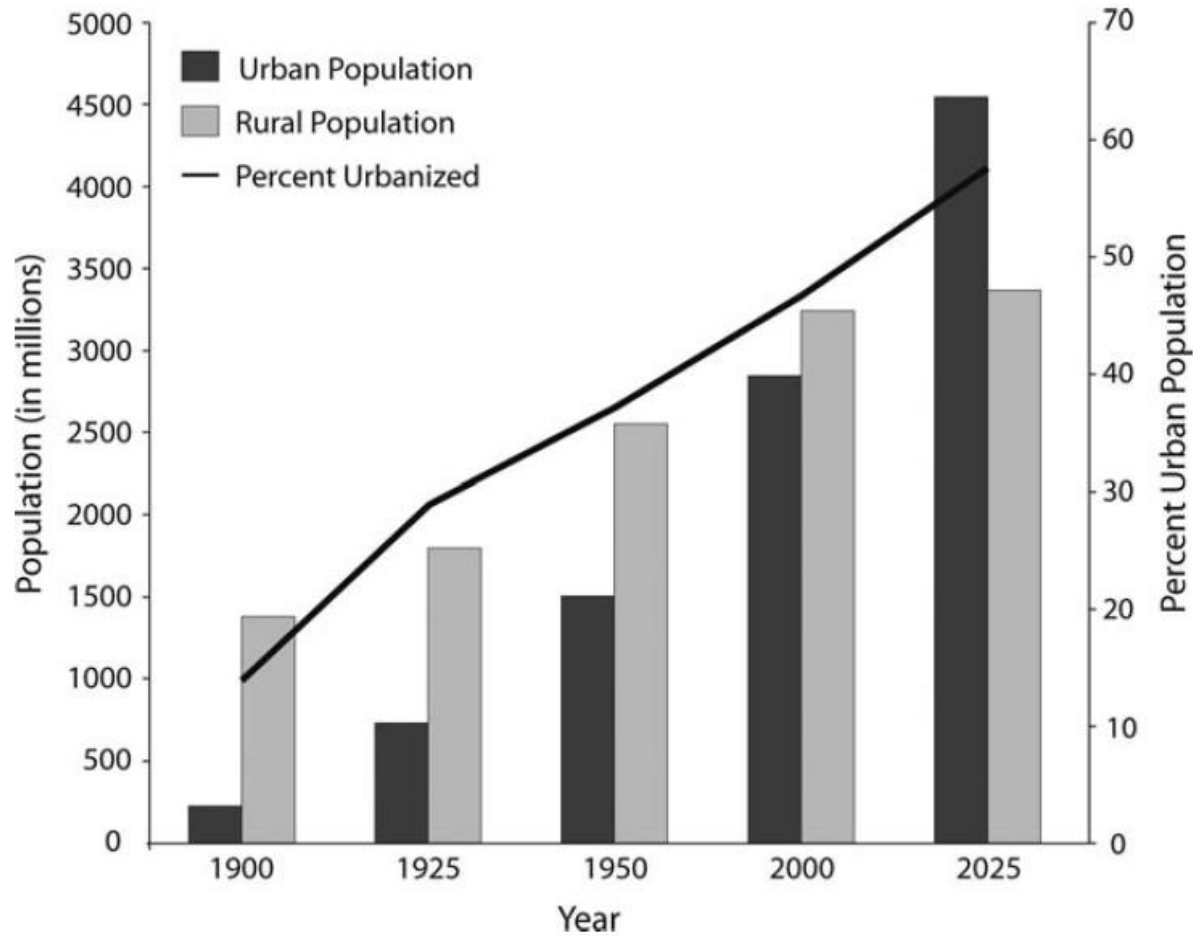
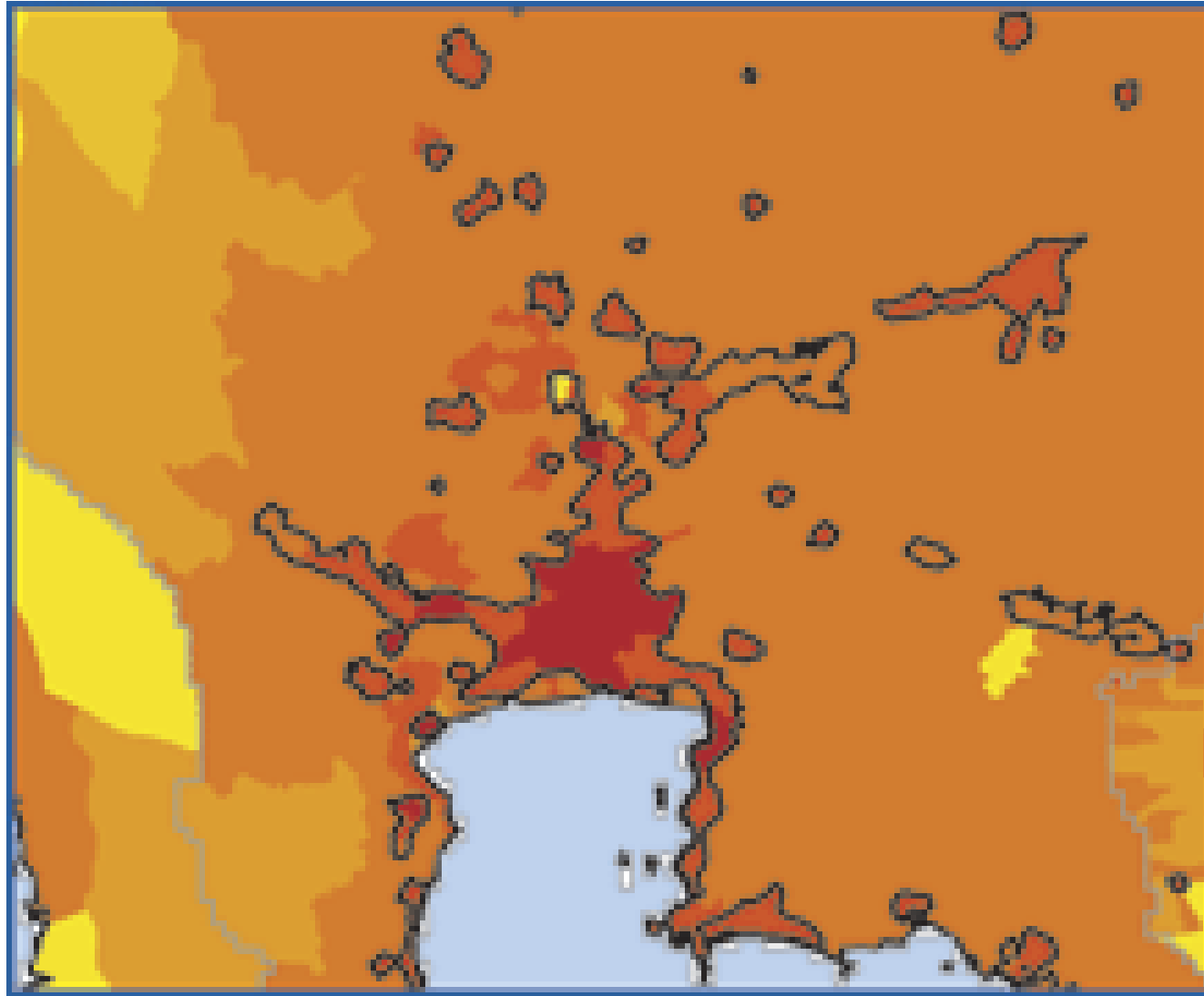


Figure 1.4. World urbanized and rural population growth, actual and projected 1900–2025 (UN 2006).

Alberti 2008, 6

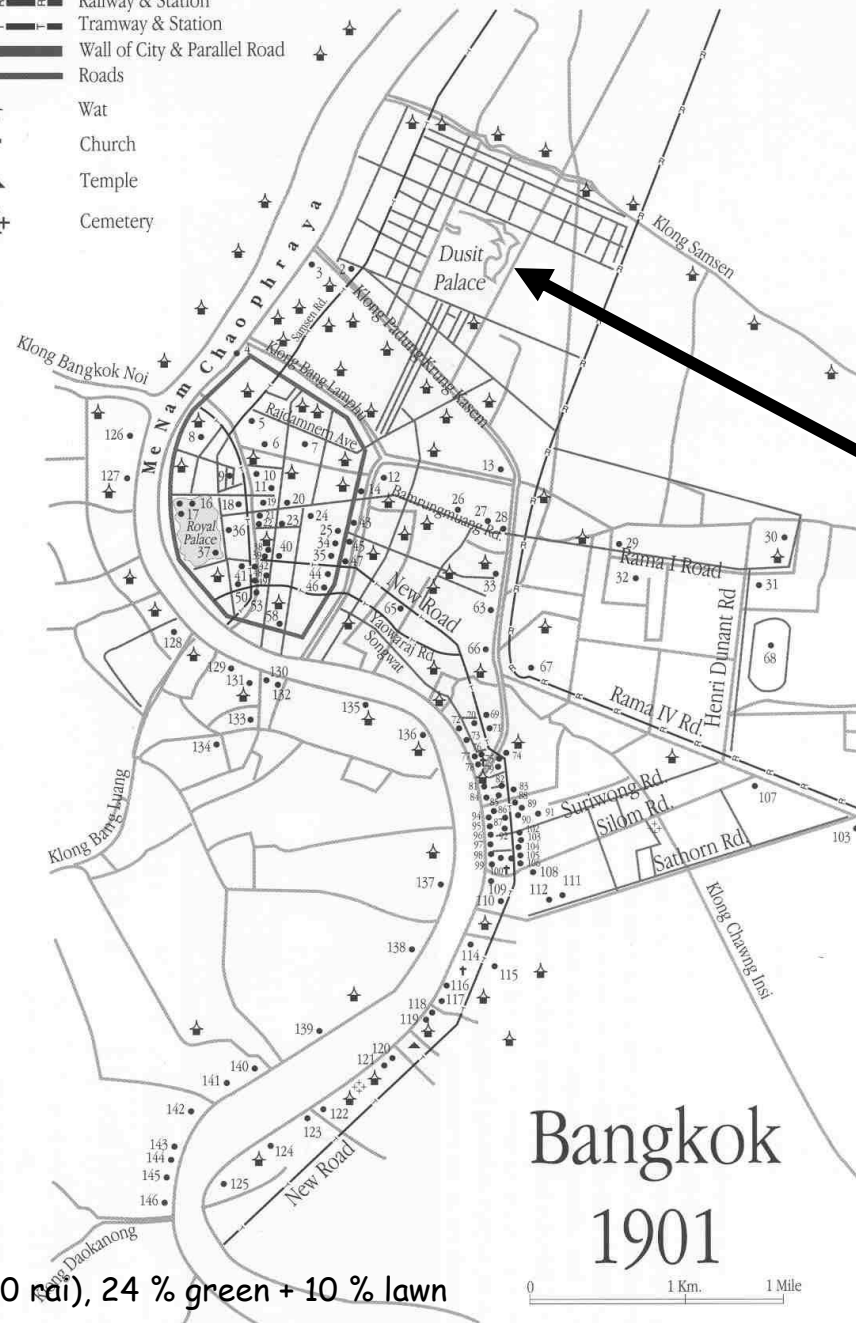
Urban Sprawl is obvious in Greater Bangkok Area



Bangkok > 200 years (2014 = Ratanakosin Era 233)

Science 307: 1718 (18 March 2005)

- +—+—+—+—+—+ Railway & Station
- +—+—+—+—+—+—+ Tramway & Station
- +—+—+—+—+—+—+—+ Wall of City & Parallel Road
- +—+—+—+—+—+—+—+ Roads
- ▲ Wat
- ✝ Church
- ▲ Temple
- ✝✝ Cemetery



MUSC = microcosm of Bangkok urbanization phenomena

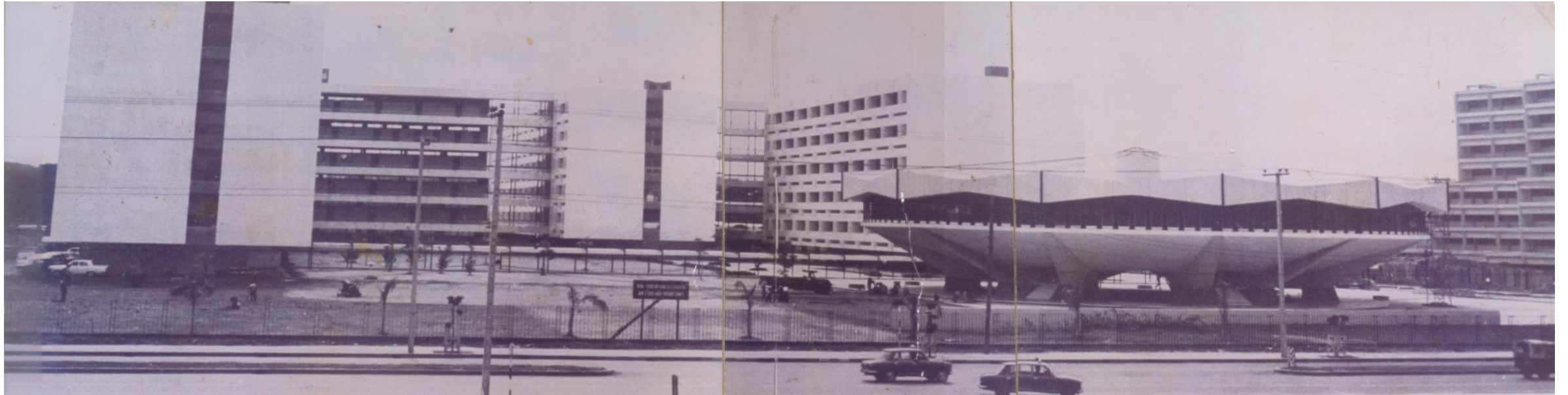
MUSC Phayathai

From wetland, Rice field,
Slums, garbage dumping ground
To modernized university
to one obvious green spot in the city

Total area = 6.5 ha (40 rai), 24 % green + 10 % lawn

Van Beek 1999, 126

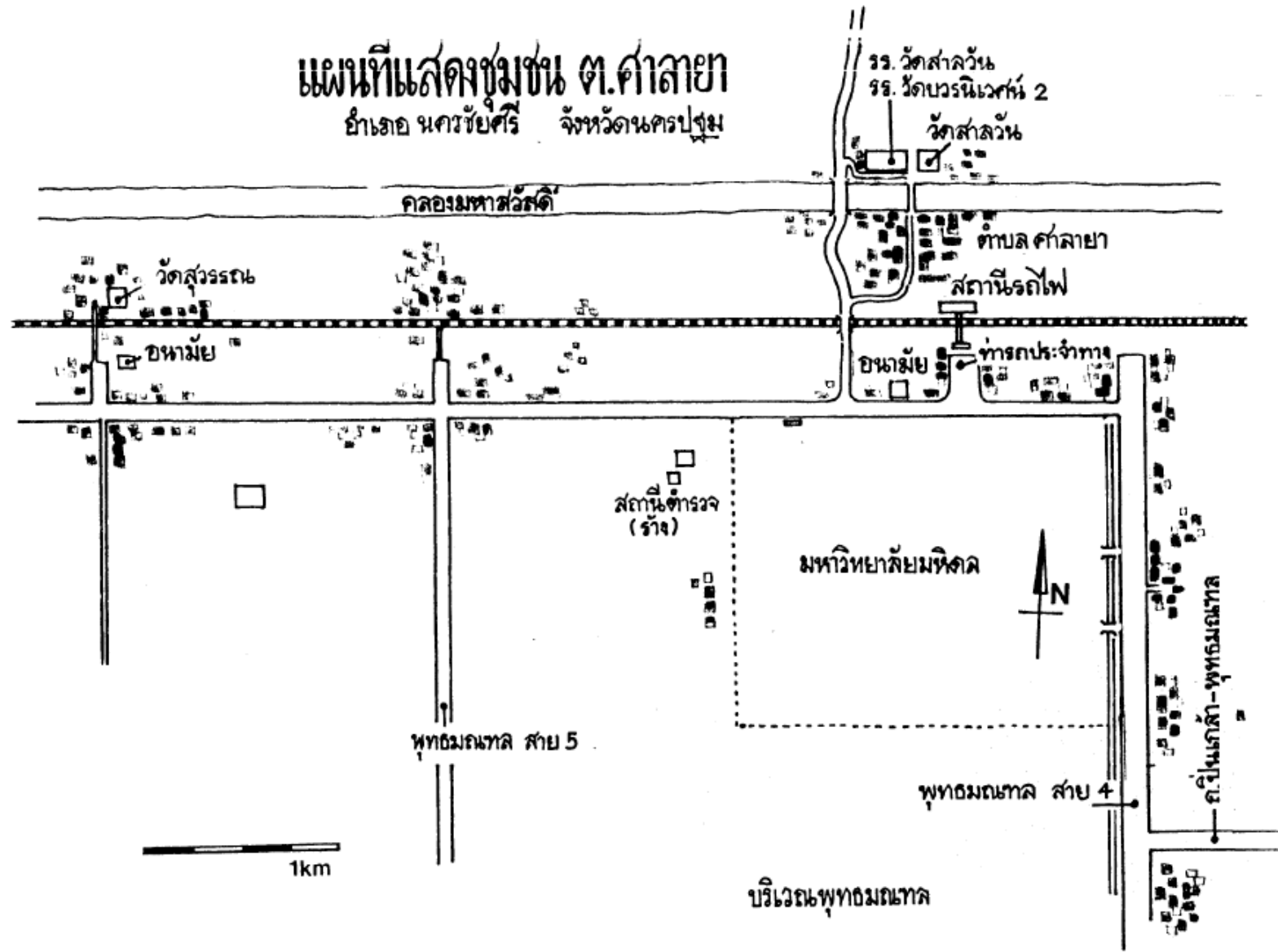
From slums, garbage dumping ground to modern university in 1968



คณะวิทยาศาสตร์ จากถนนพระรามที่ 6 (ประทัดทอง) (ปี 2511)
จากสลัม ที่ทิ้งขยะ เป็นคณะวิทยาศาสตร์

To obvious green spot area of Bangkok





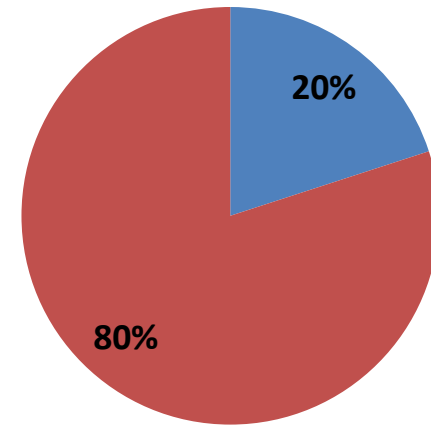
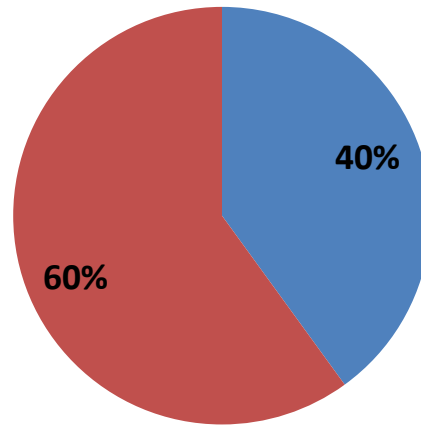
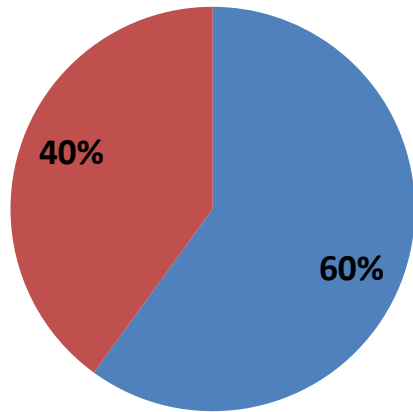
MU Salaya Campus
has become
urbanization later
with the impact of
urban sprawl

1983 = a small village

ชุมชนศาลายากับพื้นที่รอบนอก
จำลองพื้นที่สังคมเมือง & ปริมณฑล

สถาบันวิจัยประชากรและสังคม 2526

Mahidol Salaya



Wetland decline
Impervious or constructed zone increase

Total area = 200 ha
Big green area = 22.4 ha (140 rai)

 **Wetland**

 **Infrastructure=impervious**



**Use wetland & city urbanization & sprawl
for education & research in ecology: Ecology class 2009**

MU Green Epic at Salaya (Top-Down)

Urbanized Salaya
Big green area closed for 5+ years
(5+ years of Mahidol students
Lacking experiences on nature)
New green areas are
very artificial.



Still below SDGs target
Of
"Nature needs half"

Size 22.4 ha (140 Rai)
Total University area = 200 ha (1240 rai)

Accessible again since early 2017



E-co-vo-tho Racing 26 Nov 2014 (Y1)



Initiation of using Campus biodiversity for science education for
1st year students in all majors : outdoor experiences of Bio101
Total students = 266, not access to the large green spaces (opened 2 y later)
Use 50 organisms list that students in a group of 20+ had to compete to finish among 10 groups of students
= experiential learning ? Transformative learning ?

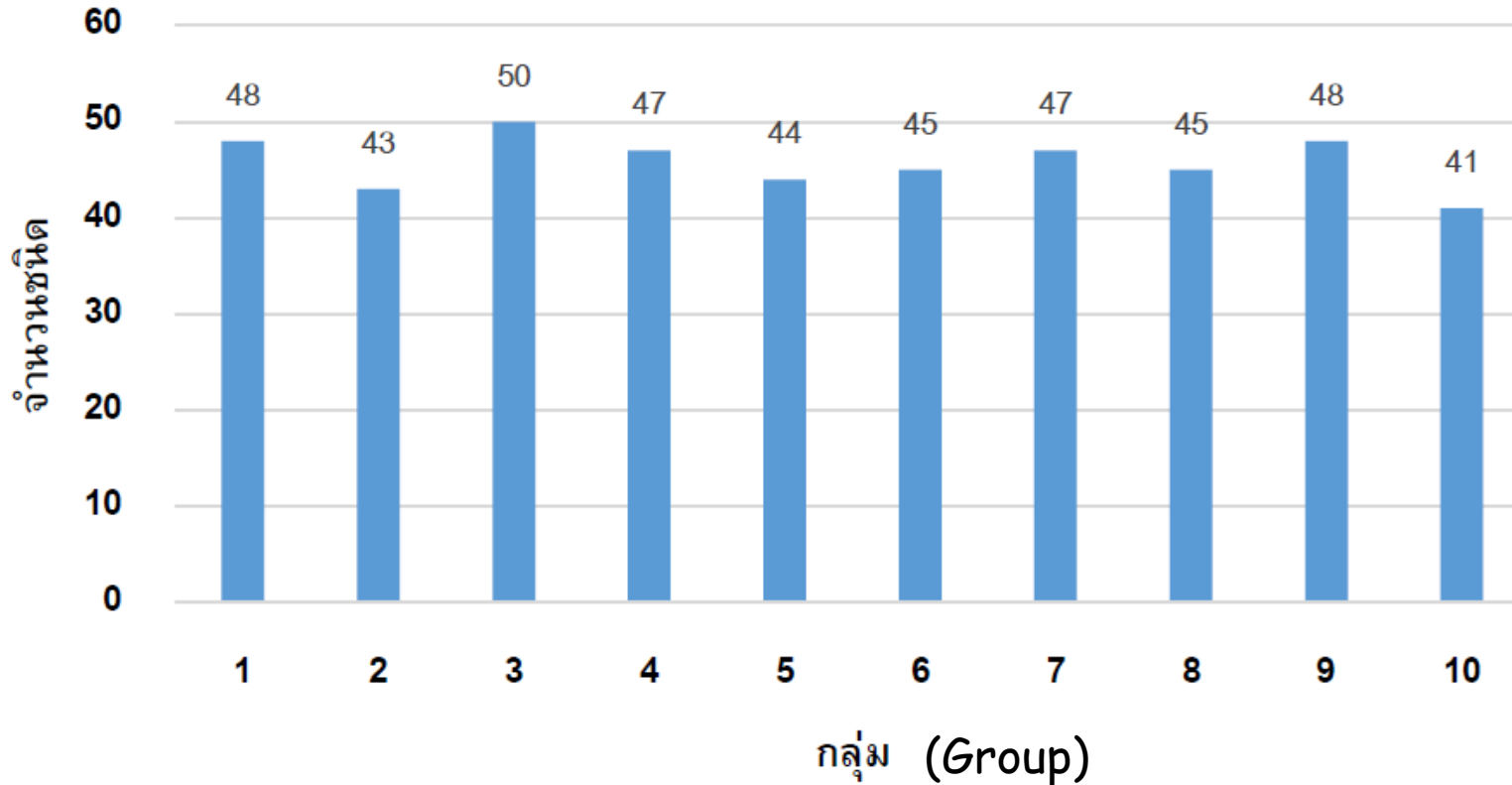
Racing game: Intragroup Cooperation, Intergroup competition

Rank Intragroup Cooperation: 3, (1,9), (4,7), (6,8), 5, 2, 10 ????

Y1:

2014

No of species found from 50 sp list



Total students: 266
27 students/group

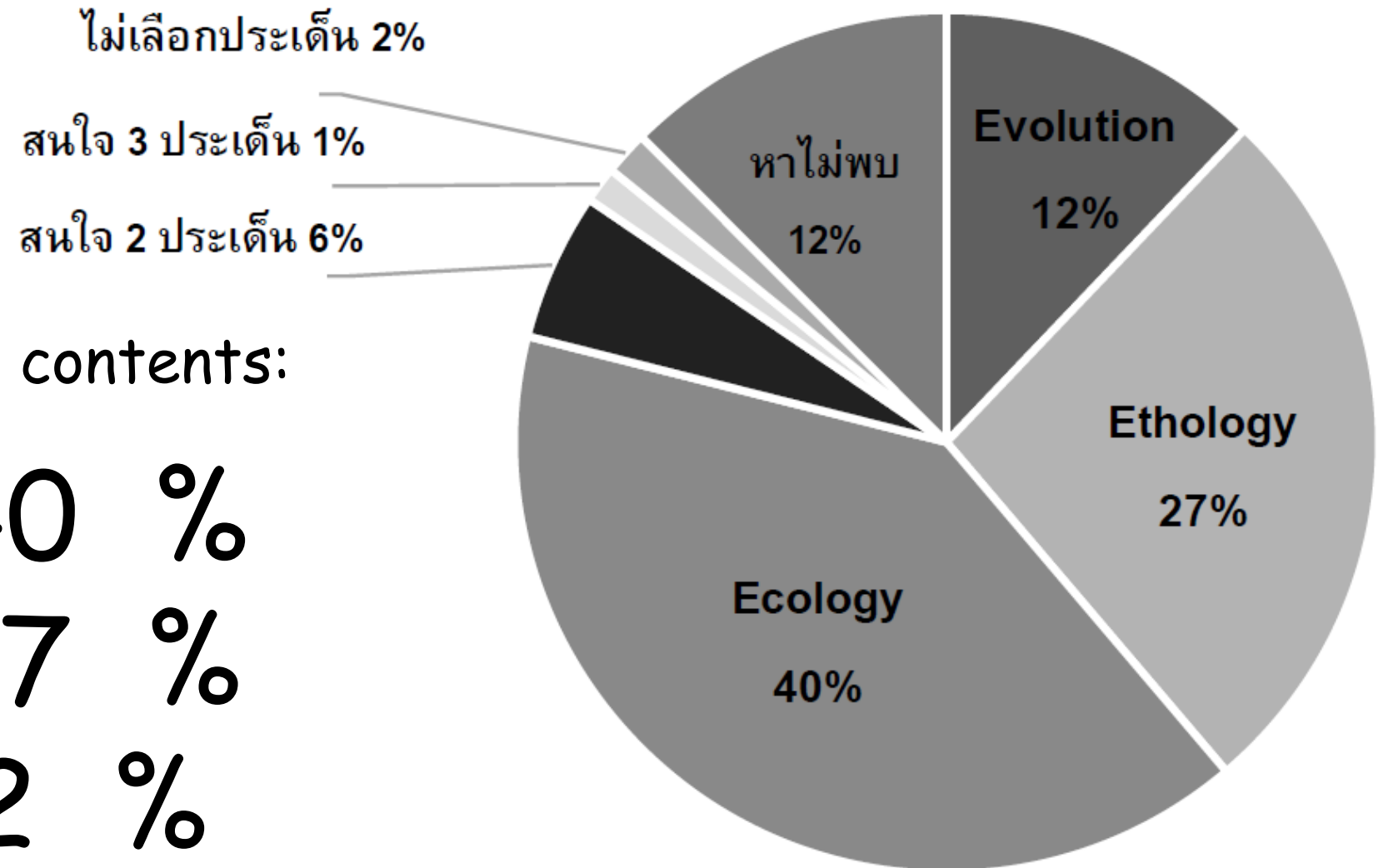
High inter-group competition drives

High intra-group cooperation

Class management = High

Total Number of species found in each group from 50 assigned species

Experiential learning from outdoor in Y1: 2014



Link between species & contents:

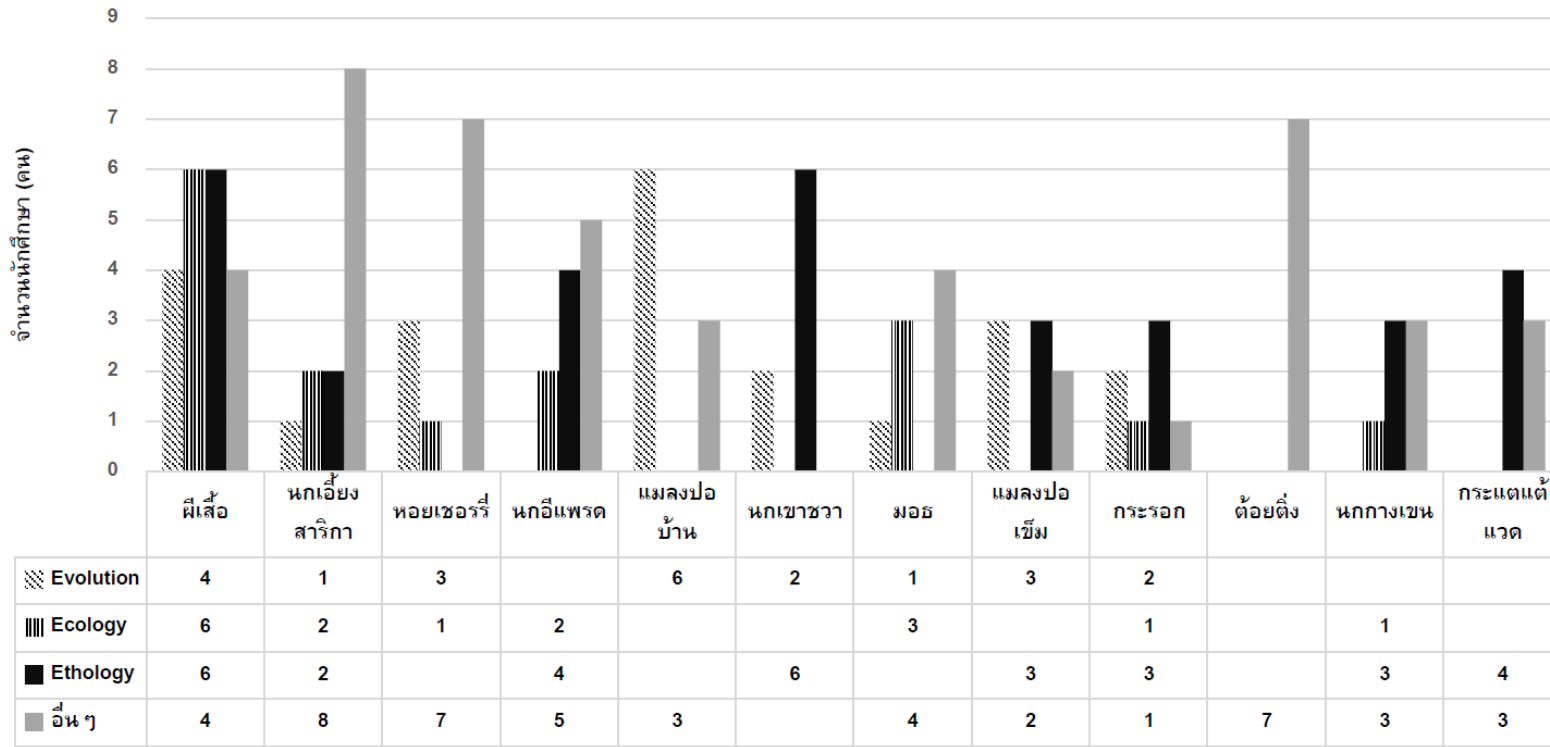
Ecology: 40 %

Ethology: 27 %

Evolution: 12 %

TOP 12 organisms interested by students

Y1: 2014



Activities for subsequent years

2014: E-co-vo-tho Racing (already presented)

2015: Similar outdoor activities like 2014 but 60 species pool

2016: Multiple scale of organisms & environment

Meet the President

2017: Tangled bank approach in different habitats

2018: Similar to 2016



2017





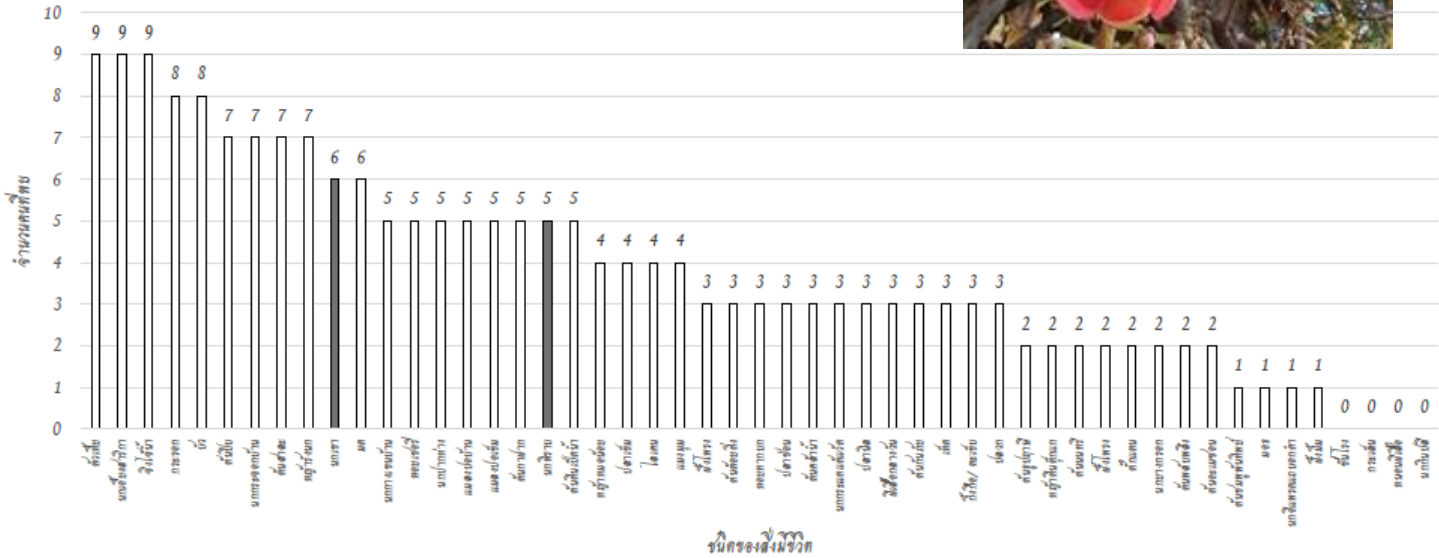
2018

Class management = low (Student-centered?)

Total students attended = 57 (Total = 271 of original 328)



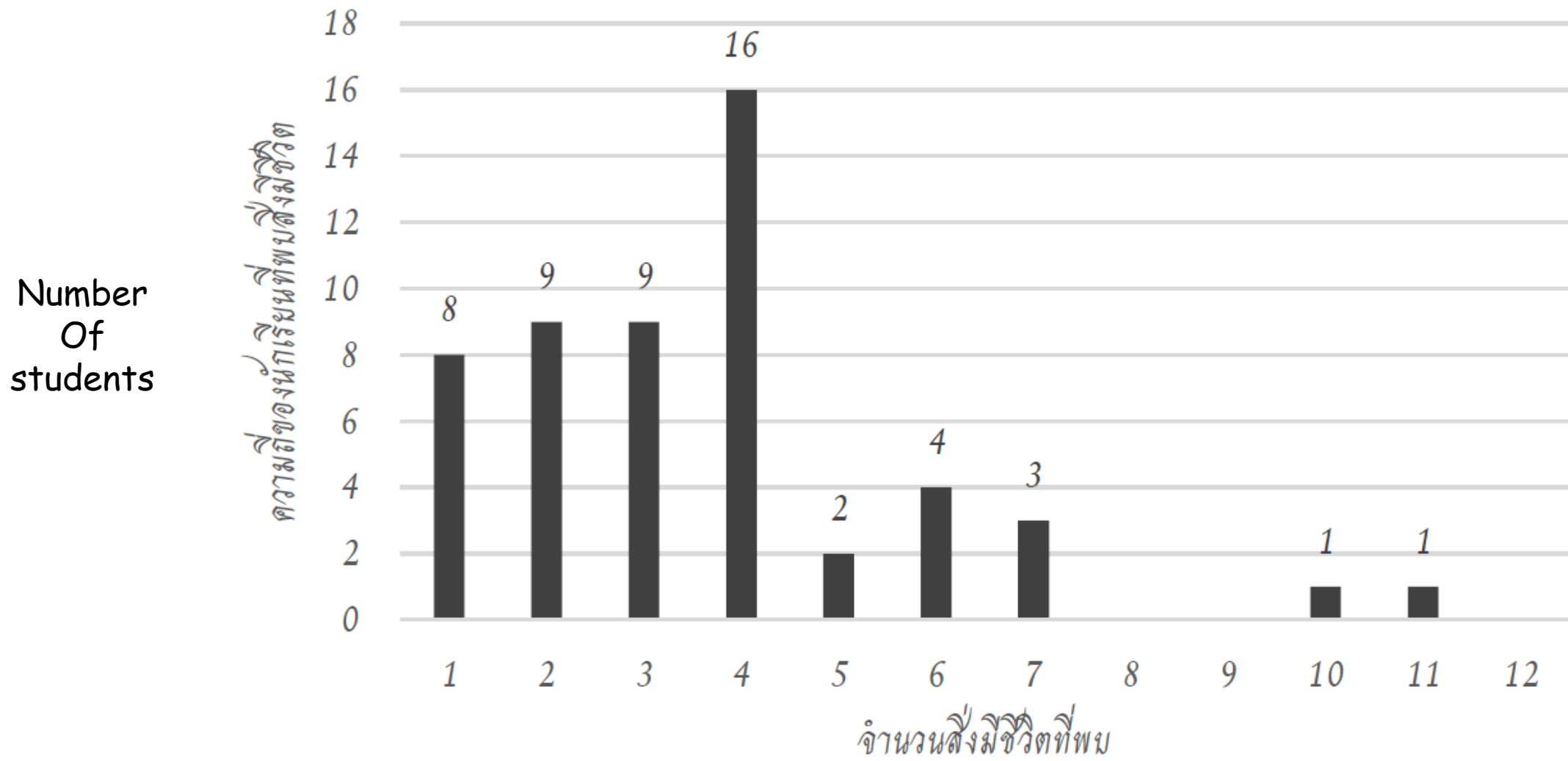
2018



Top 10 Rank species found

26 Nov 2018

Distribution of number of species found by each student in 2018



Number of species found by each student

Observations Link between species & contents:

	2014	2018
Ecology:	40 %	22 %
Ethology:	27 %	43 %
Evolution:	12 %	35 %

Educational values of Campus biodiversity

Species found in 2014 are more than 2018

2014 top species = butterflies;

2018 top species = water monitor

2014 experience guide to ecology

2018 experience guide to ethology (interact with human)

Campus biodiversity have been declining &
supply less experiences of nature to students

Meet the President

From relaxing tour of nature for the President but get more administrators



Salaya
Educational
Ecology

+ Former
Chairman of the
University Council
Of Mahidol University

31 Jan 2017

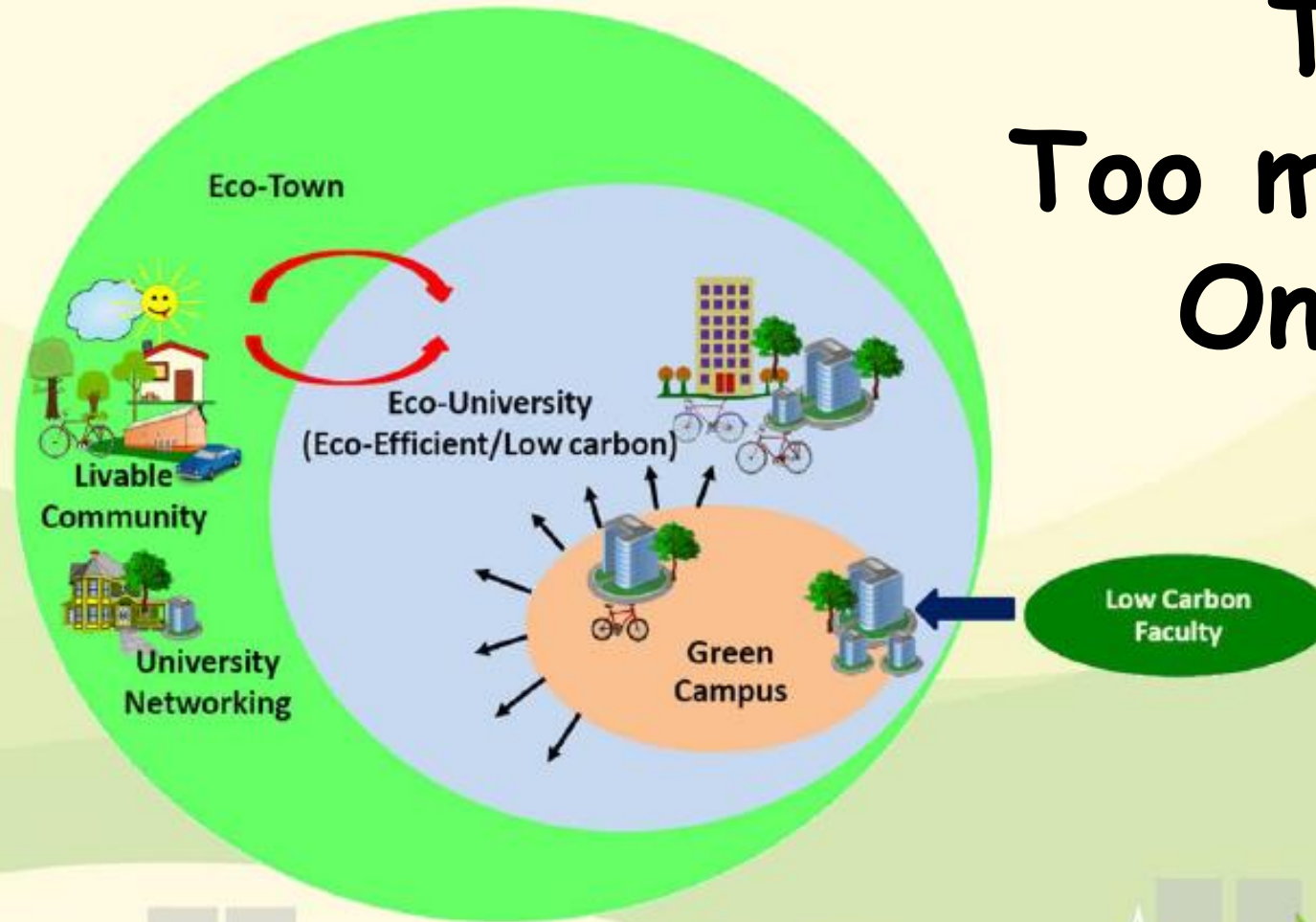
Salaya Educational Ecology : Lineated barbet found in Salaya



31 Jan 2017



Lineated Barbet
Found in mature or old garden
(trees become bigger
suitable to be
excavated for nesting holes)
Found more in
37 years old Campus
at Salaya



**Top-Down:
Too much emphasize
On low carbon**



Mahidol & 24 institutes aim to be sustainable universities



Not just Carbon
But should be
"Half nature"
SDGs:
"Nature needs half"

13 Feb 2018

Conclusion

University = more & more urbanized

Less & less nature (biodiversity) exist in a university

Less & less nature experiences students can obtain

Education activities to increase students' experiences on nature
(bottom-up but limitation)

Campus biodiversity decline = less educational ecology on nature
(= limitations of top-down ?)

Green University still emphasize on low carbon

New SDGs (Sustainable Development Goals) since 2015
request "half nature"

Mahidol university requires more biodiversity to fulfil "half nature"
according to SDGs (a new goal)

Questions are welcome