

Background & purpose

- Agriculture and forest fragmented landscapes alter the composition and configuration of habitat elements which affect biodiversity and distribution of ecosystem services (ES).
- Agricultural practices in Southeast (SE) Asia range from traditional agroforestry to large agro-industrial plantations that form distinct fragmentation processes and patterns.
- Reviews on fragmentation studies are geographically bias towards temperate regions. Furthermore, few specifically focus on SE Asia despite the alarming rates of habitat and biodiversity loss occurring.
- A deeper analysis of the existing evidence on fragmentation in forest and agriculture landscapes in SE Asia is needed.**

Research objectives

- To identify and describe the type of studies found on landscape fragmentation in SE Asia.
- To examine the methods implemented to measure fragmentation across different types of forest and agriculture landscapes
- To synthesise reported effects of landscape fragmentation on biodiversity and the distribution of ES
- To explore the implications of our findings and identify key areas of research that are needed to understand the different dimensions of landscape measures,

Systematic literature review process

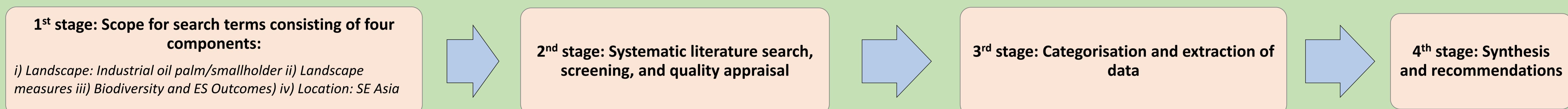


Figure 1: Stages of the systematic literature search

Overview of studies (Total: 30 studies)

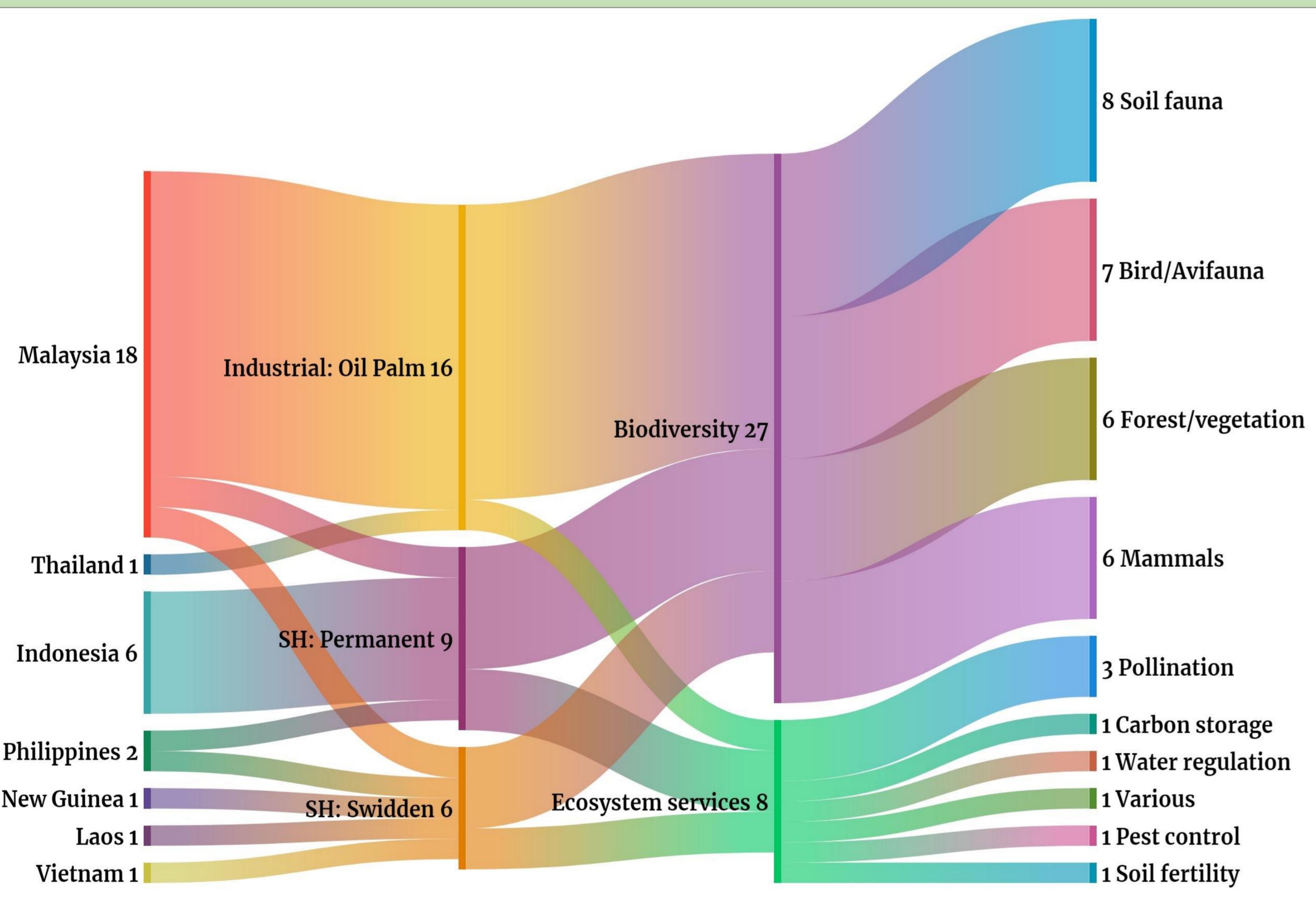


Figure 2. Distribution of studies by county, landscape, group, and sub-group.

- Malaysia led in the no. of studies carried out in industrial oil plantations, none in Indonesia; Little research on fragmentation in smallholder landscapes.
- Strong taxonomic bias towards avifauna and soil fauna; Paucity of studies on ES.

Biodiversity and ecosystem service outcomes



Overall, smaller fragments that were more isolated in industrial oil palm plantations sig. reduce biodiversity - particularly of conservational concern.

Riparian reserve width bordering oil palm plantations had no effect on dung beetles (n=1), but a positive determinant for bird species richness (n=1).

Strong negative edge effects from oil palm altered vegetation structure in forests (n=2).

Small forest fragments have little impact on boosting soil fauna in oil palm (n=2).

Contiguous forest and forest fragments had no sig. impact on oil palm productivity (n=1).



Despite missing two key landscape measures (forest patch size and landscape composition), studies reported positive benefits of forests for biodiversity and ecosystem services in agricultural habitats.

Crops grown near agroforests experienced greater pollination stability (n=3)

Agroforests sig. boosted soil fauna in oil palm smallholdings (n=1)



We found that studies reported positive effects between fragmentation and species richness, but we observed a lack of studies that specifically assessed the conservational value and status of species.

Configuration in swidden systems influenced water flow across landscape (n=1). Patch size of secondary forests significantly influenced the rate of biomass carbon recovery above ground to old growth forests (n=1).

In swidden plots, abundance, avifauna diversity, and species composition were all positively influenced by neighbouring intact forest habitats. (n=1)

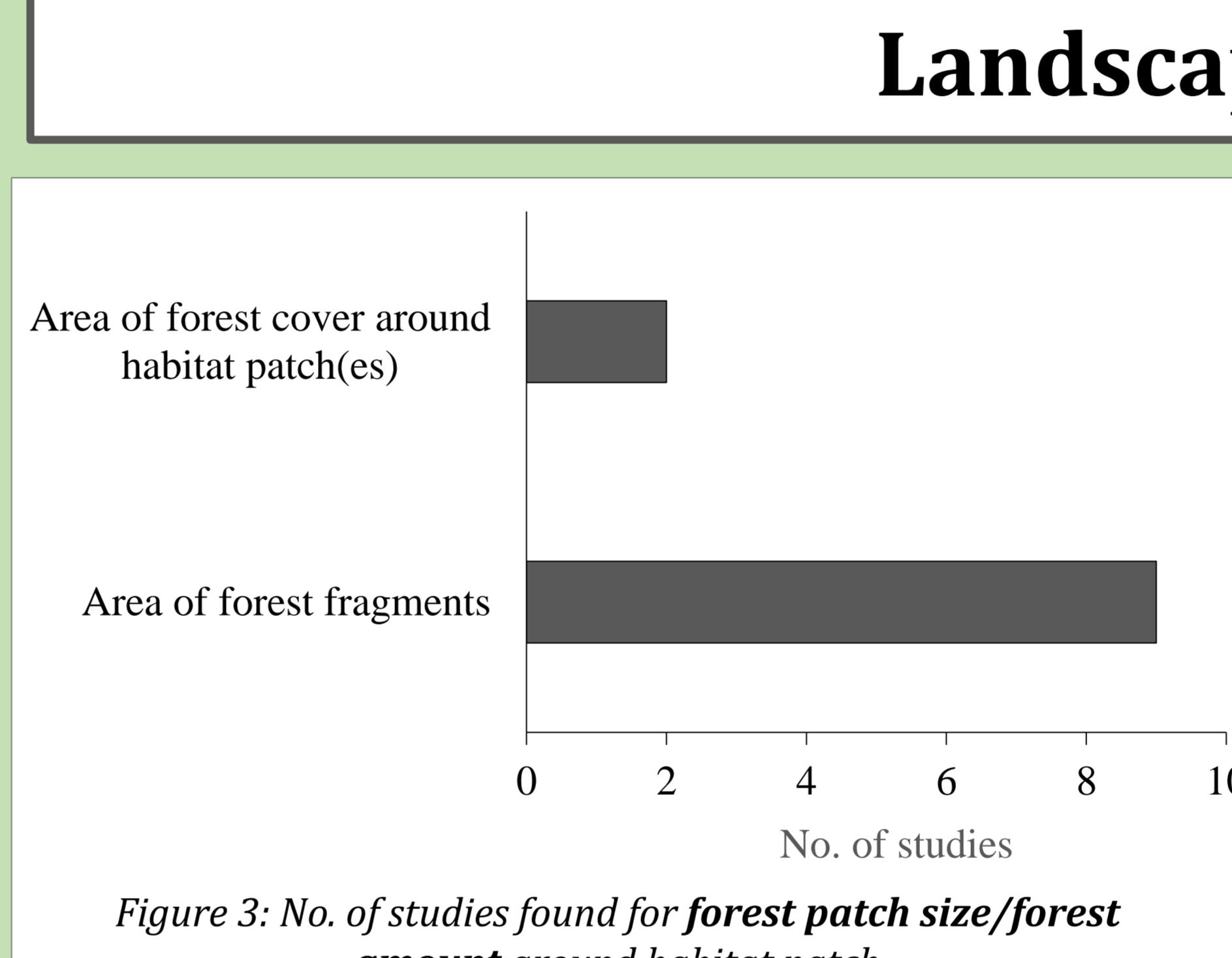


Figure 3: No. of studies found for forest patch size/forest amount around habitat patch

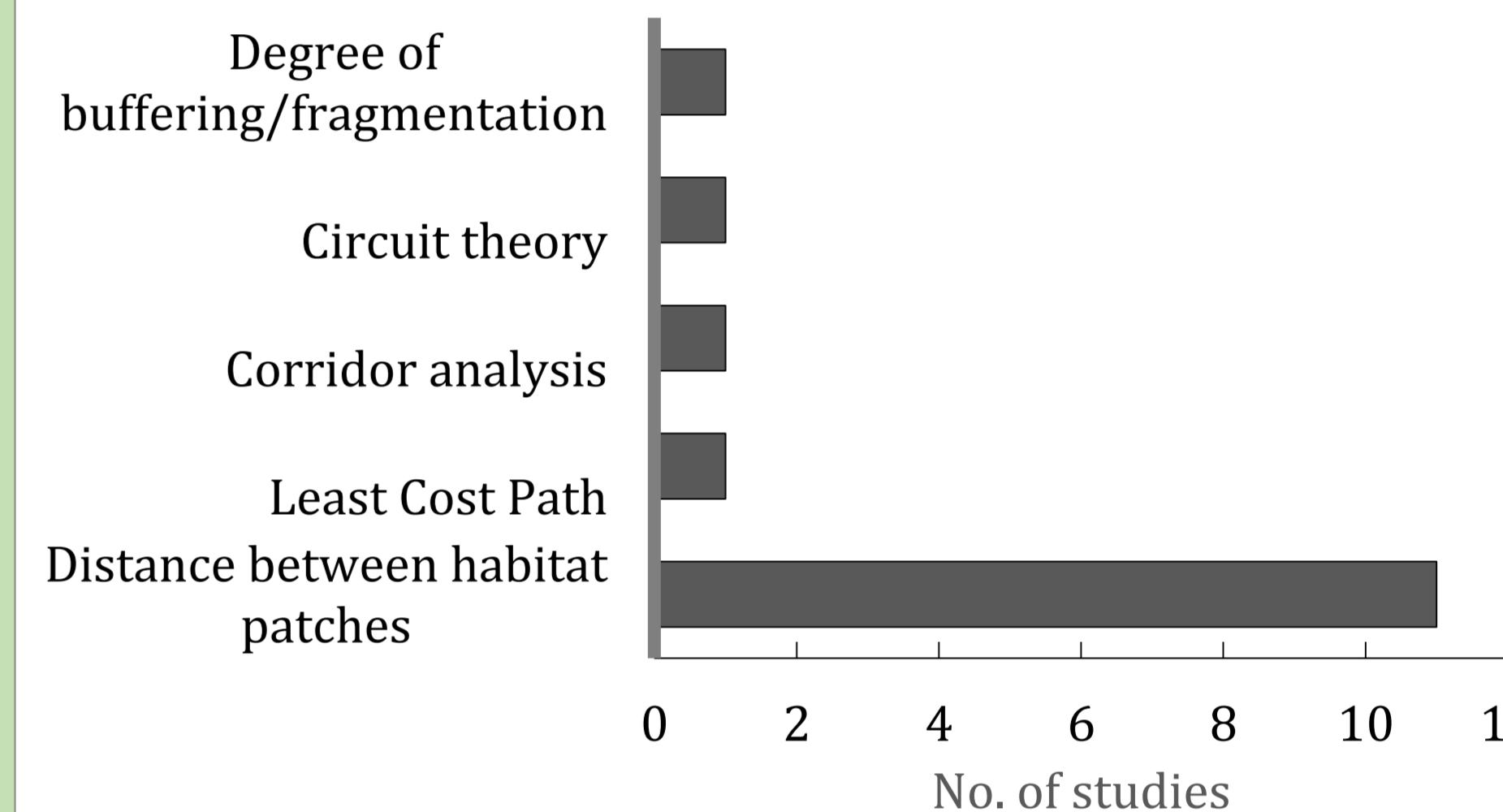


Figure 4: No. of studies found for isolation and connectivity by type of metric.

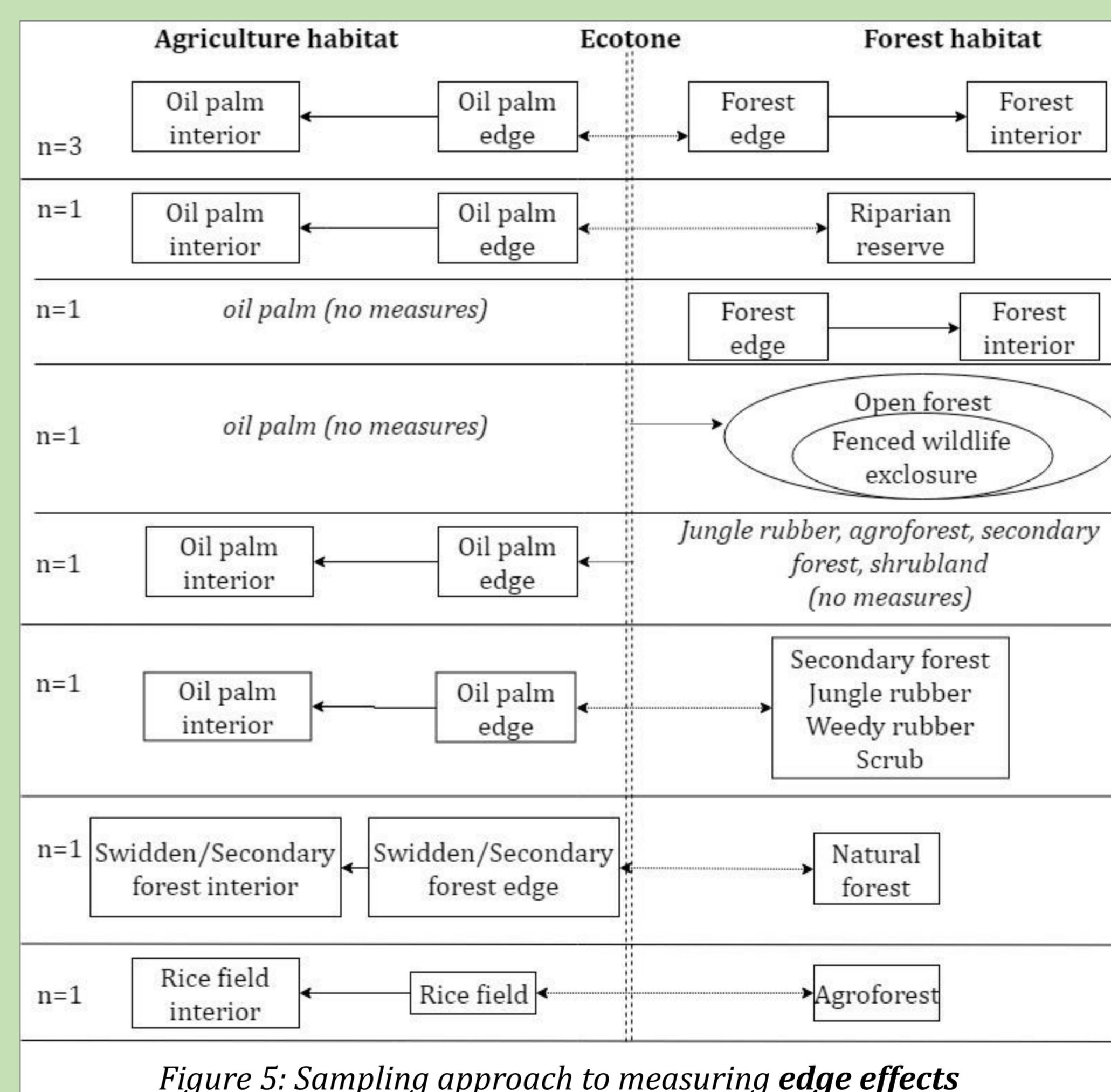


Figure 5: Sampling approach to measuring edge effects

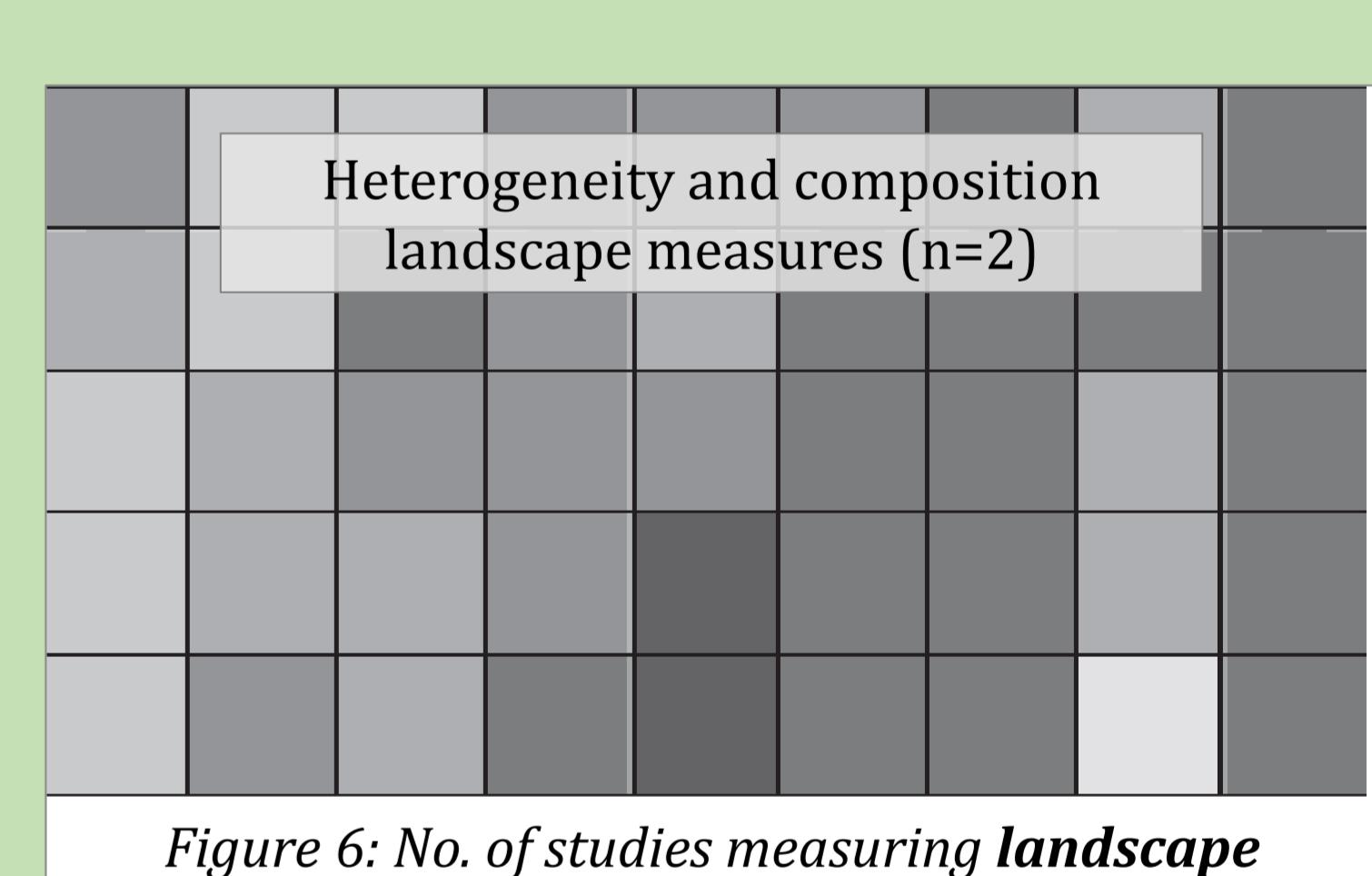
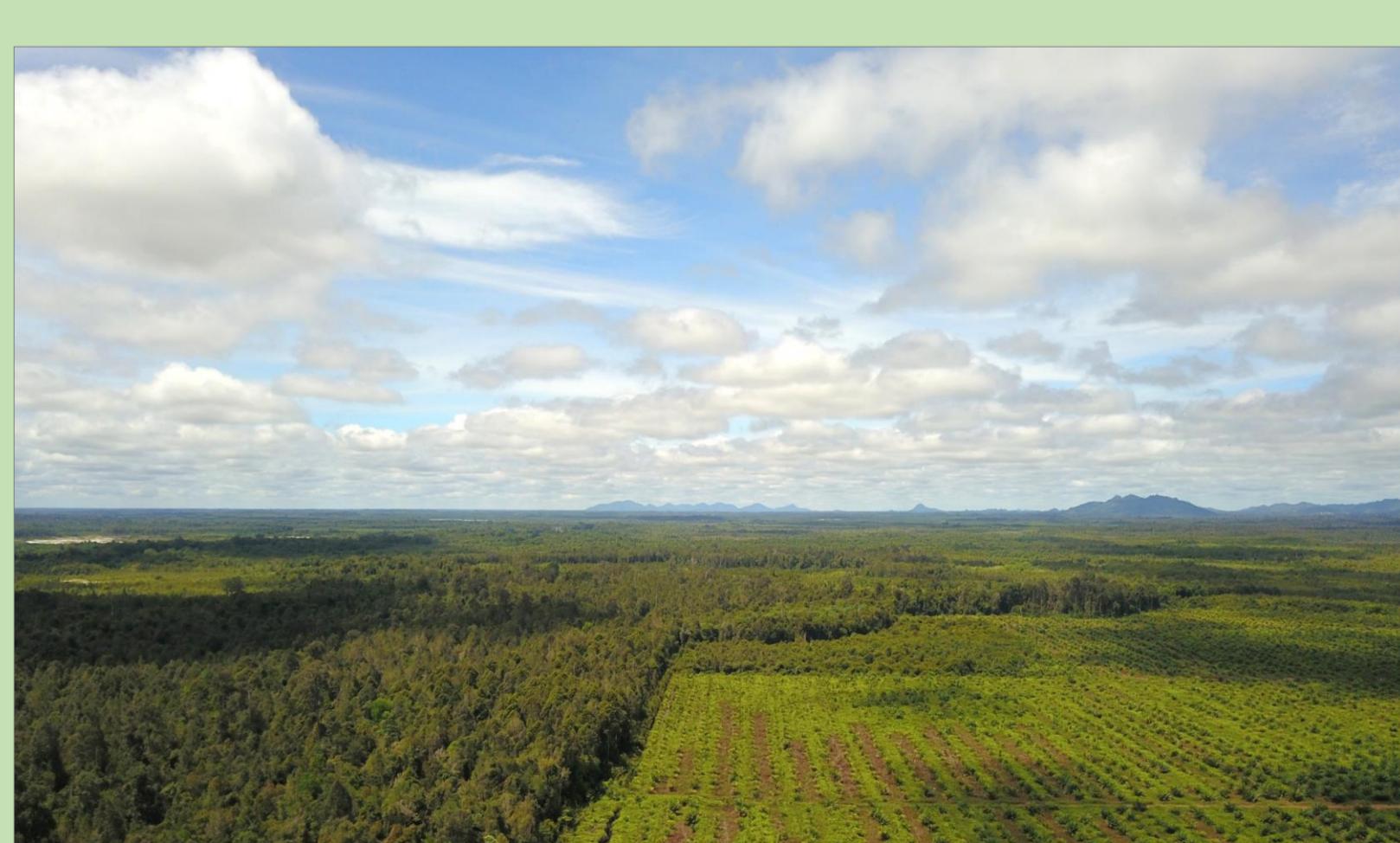


Figure 6: No. of studies measuring landscape composition/diversity



Outlook:
Moving beyond the question of good or bad fragmentation

How to better assess landscape fragmentation in different types of forest/agriculture landscapes?

- The landscape context - level of human pressure and heterogeneity of habitats
- The suitability of habitats, the range of tolerance to different habitats, and the dispersal ability of organisms
- Accounting for lag time effects of fragmentation, particularly for flora. Greater research is needed on how fragmentation contributes to the recovery of habitats could help support conservation efforts on landscape restoration.