Sampling Process and Data Recording

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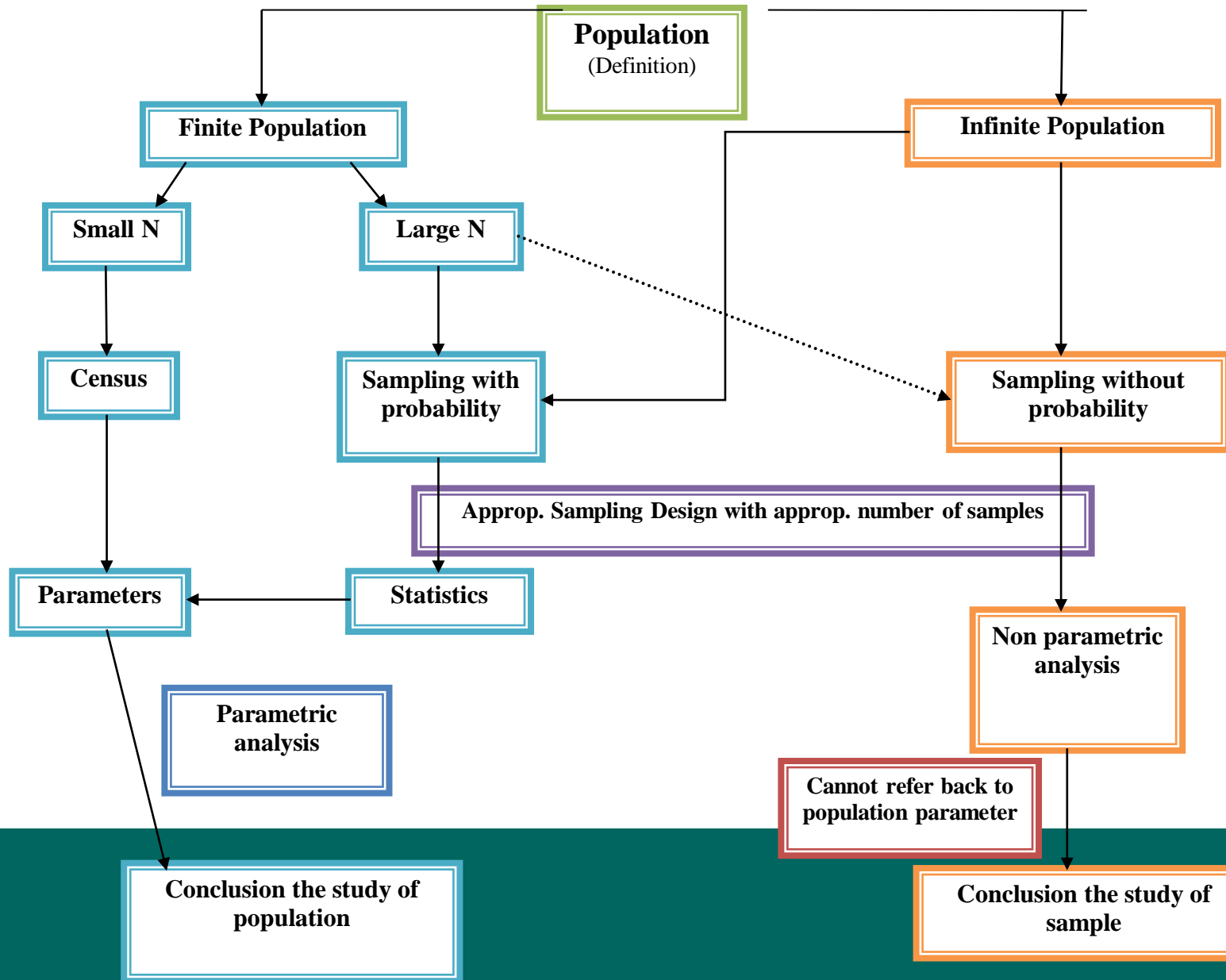E-mail: thanitha.t@ku.th
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General Roadmap for Statistical Analysis

Roles of Statistics in Research

Sampling Statistics

Population

Samples

census

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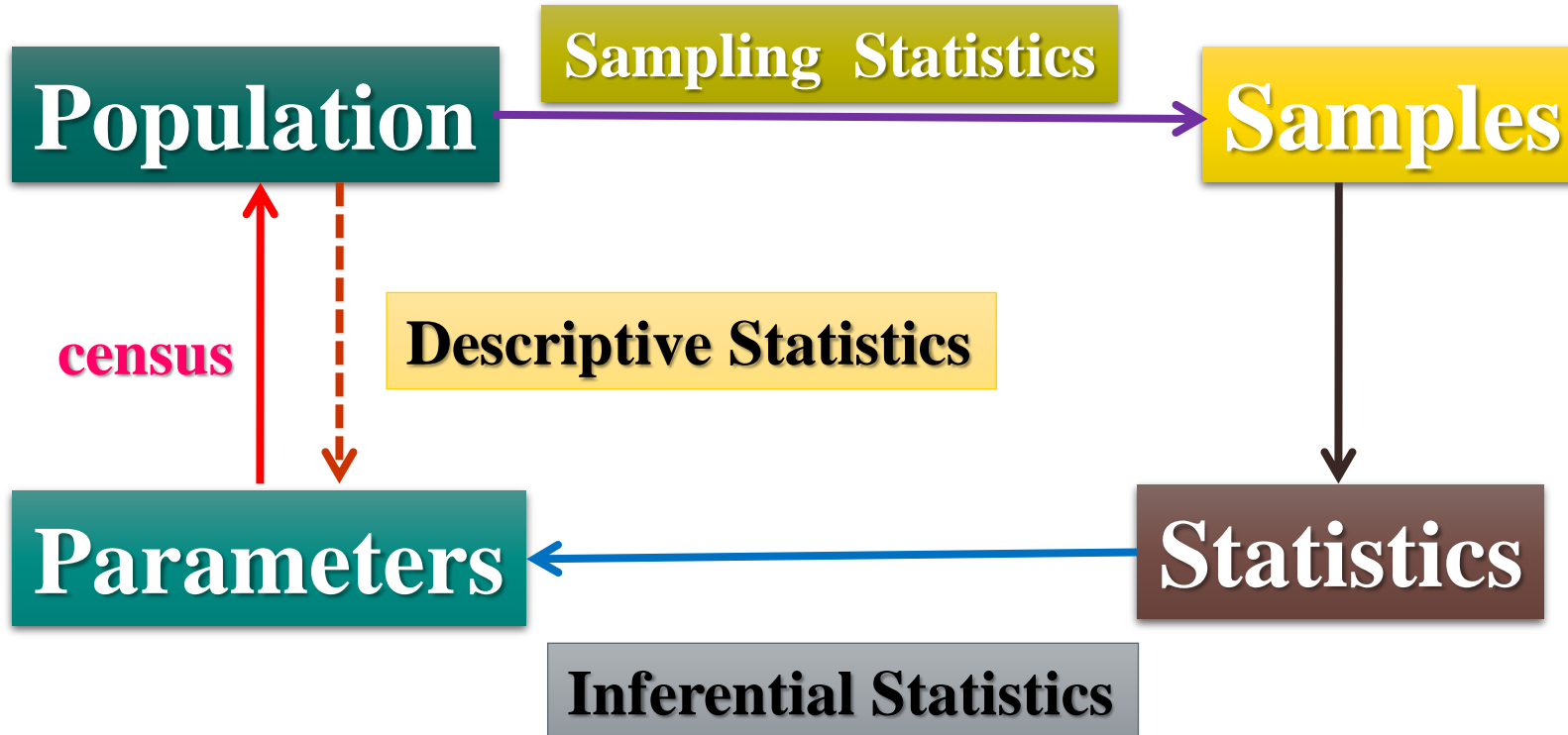
The objectives of sampling

- **To examine 'representative' sub – sets of the data to 'estimates' of population parameters**
  - **LFD, Catch, Fishing Effort, Price, etc.**
  - **as close as possible to the 'true' values**
  - **would be obtained through population**
- **To reduce operational costs**
- **To reduce analytical and computing requirement**

Accuracy and Precision in Sampling

In the proceeds of sampling 'accuracy' and 'precision' are two *different*

statistical indicators

Need to clarifying their meaning

Sampling Accuracy

Usually expressed as a relative index in percentage and indicates the closeness of a sample – based parameter estimator to the true population value

When expressed as a relative index, sampling accuracy is independent of the variability of the data population

When sample size increases and sample are representative, sampling accuracy also increases

Sampling Precision

- **Related to the variability of the sample used and can be measured by** *'Coefficient of Variation' or CV*

- **Also determine the** *confident limit* **of estimates**

- **Estimates can be of high precision, but low accuracy, when sample are not representative and estimated result lower or higher than true population value**

- **Precision will be** *increasing* **as well as the** *increasing of the sample size* **and the** *decreasing of variables*

Rules of Thumb

(Gross estimation for sample size)

- If N about $\leq$ **999** : n should be sampled at least **25%**

- If N about **1,000 – 9,999** : n should be sampled at least **10%**

- If N about **10,000 – 99,999** : n should be sampled at least **5%**

- If N about $\geq$ **100,000** : n should be sampled at least **1%**

Variability Indicators

- **To determine the variability, the *'Coefficient of Variation" (CV)*, which is showing in percentage, are commonly used**

- **When CVs are very low (0.1%, 0.5%, etc.) it's suspicious that data are biased or very homogeneous data population**

The Risks by biased estimates

- **Biased estimates are systematically *lower or higher* than the true population value**

- **Generally caused from the sample that not representative of the population data**

- **Not easily detectable, cannot detect by time and CV also cannot detect bias data**

- **The best approach to the reduction of bias is through the application of appropriate *sampling design***

Reducing of the risk of biased sample

Data collection at sampling site

- Sampling should always be undertaken from a *random selection*
- When boat landed within short period, recorders those times tend to sample with a small catch in order to cover as many landings as possible
- When boat landed in longer period and recorders must visit other sites during the day, only the first landings at the first site will be sampled

- Field teams would then cover the chosen locations visiting all of them at appropriate times, say once a month
- Such an a priori selection of sampling sites enables planning for sufficient and mobile human resources
- The pre–selection process is very important for long–term data collection for avoiding biased data
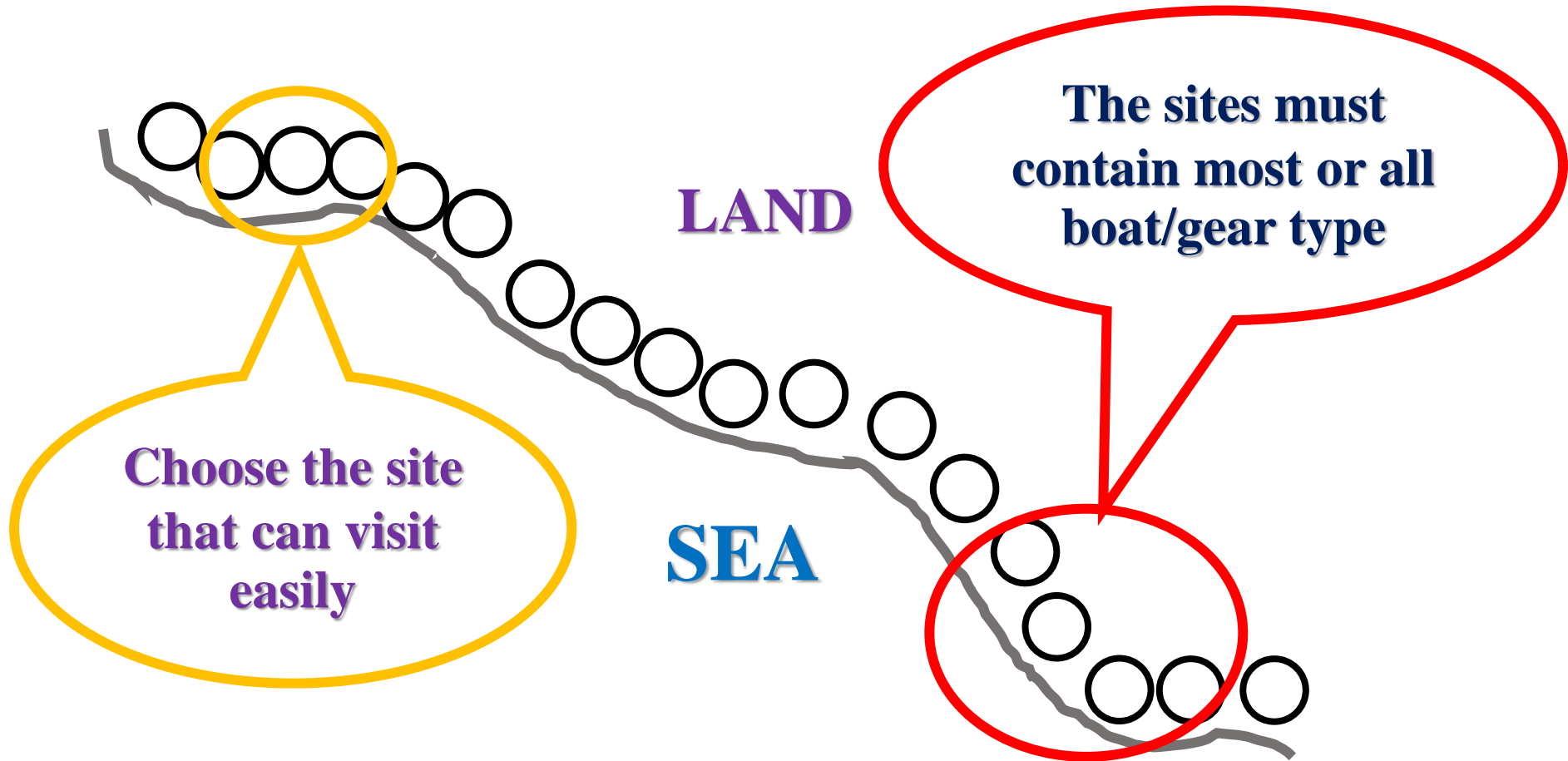
Reducing of the risk of biased sample

Criteria for selecting sampling sites

- Sampling sites should provide a satisfactory geographical coverage of the statistical area
- Original frame surveys of the numbers of boats by site and boat/gear type will indicate the relative importance of sites in terms of potential fishing effort
- Sampling sites should represent all boat/gear types involved in the survey, and sampling should focus on sites with larger numbers of fishing units

The sites must contain most or all boat/gear type

LAND

Choose the site that can visit easily

SEA

Reducing of the risk of biased sample

10 Minutes Break