In conjunction with ASEAN COSTI-80 on 14 Oct 21

STI x LIVELIHOOD x WOMEN

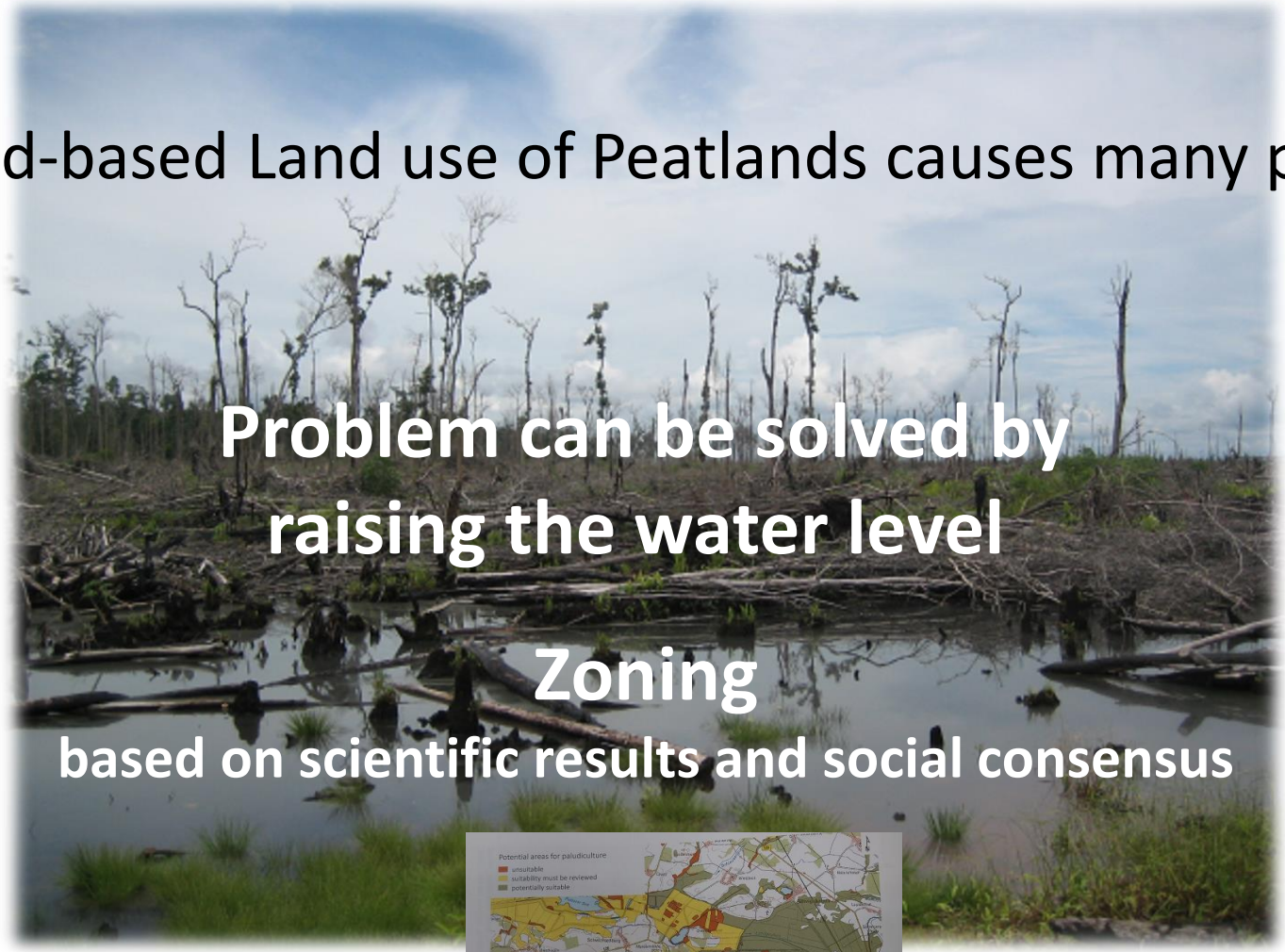
For the Sustainable Use of Peatland and Mangrove:
Female Empowerment in Research and Practice
through ASEAN-Japan Collaboration

The potential of sago palm for plantation on rewetted drainage-impacted peatland

Yukako Monda

Kyoto University, Japan

Drained-based Land use of Peatlands causes many problems



Problem can be solved by raising the water level

Zoning

based on scientific results and social consensus

Wichtmann et al.2016

Minor degradation

Forest Rehabilitation

Major degradation

Paludiculture

Paludiculture

The sustainable production of biomass (agricultural or silvicultural) on **wet peatlands**(Wichtmann et al. 2016).
Re-wetted peatlands also OK.

This include the revival of traditional land use through modified land-use schemes.

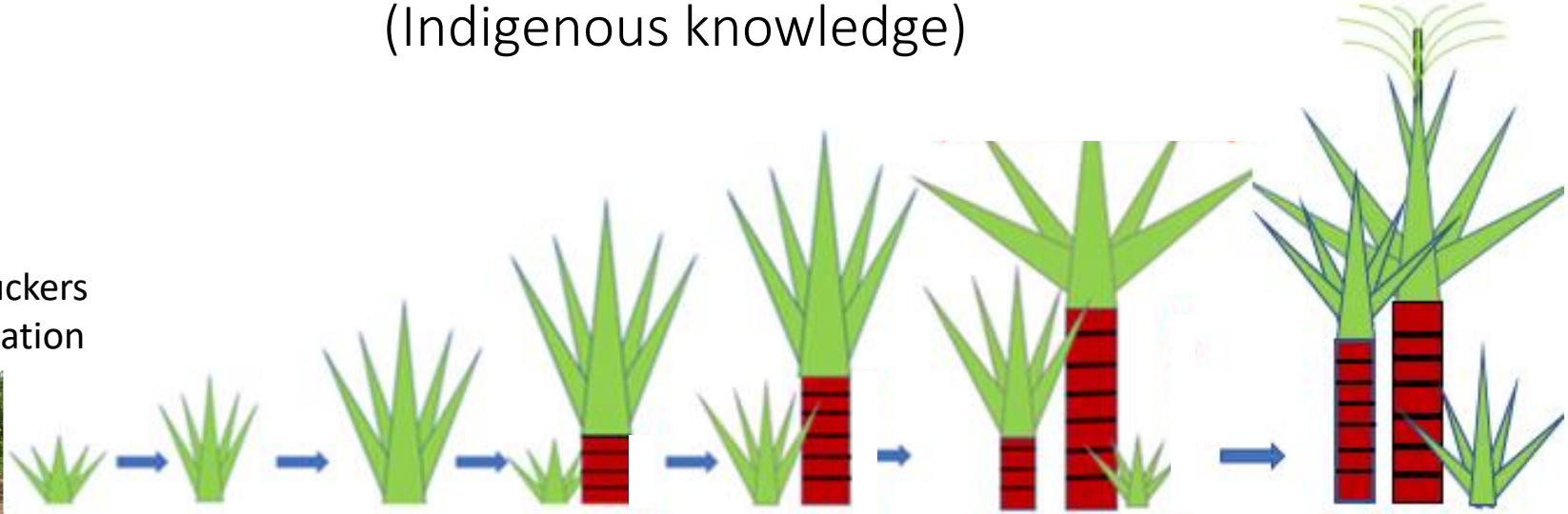
Sago palm (*Metroxylon sagu)*

- Traditional cultivated tropical wetland plant
- Submerged condition = OK
- Starch accumulation in the pith
- Cultivated by methods based on semi-traditional cultivation

Smallholder's plantations by semi-traditional method

(Indigenous knowledge)

Sago's root suckers for transplantation



Change in frond length

Flower bud

Manual slashing trees/shrubs/weeds

To make planting row (partial field preparation)

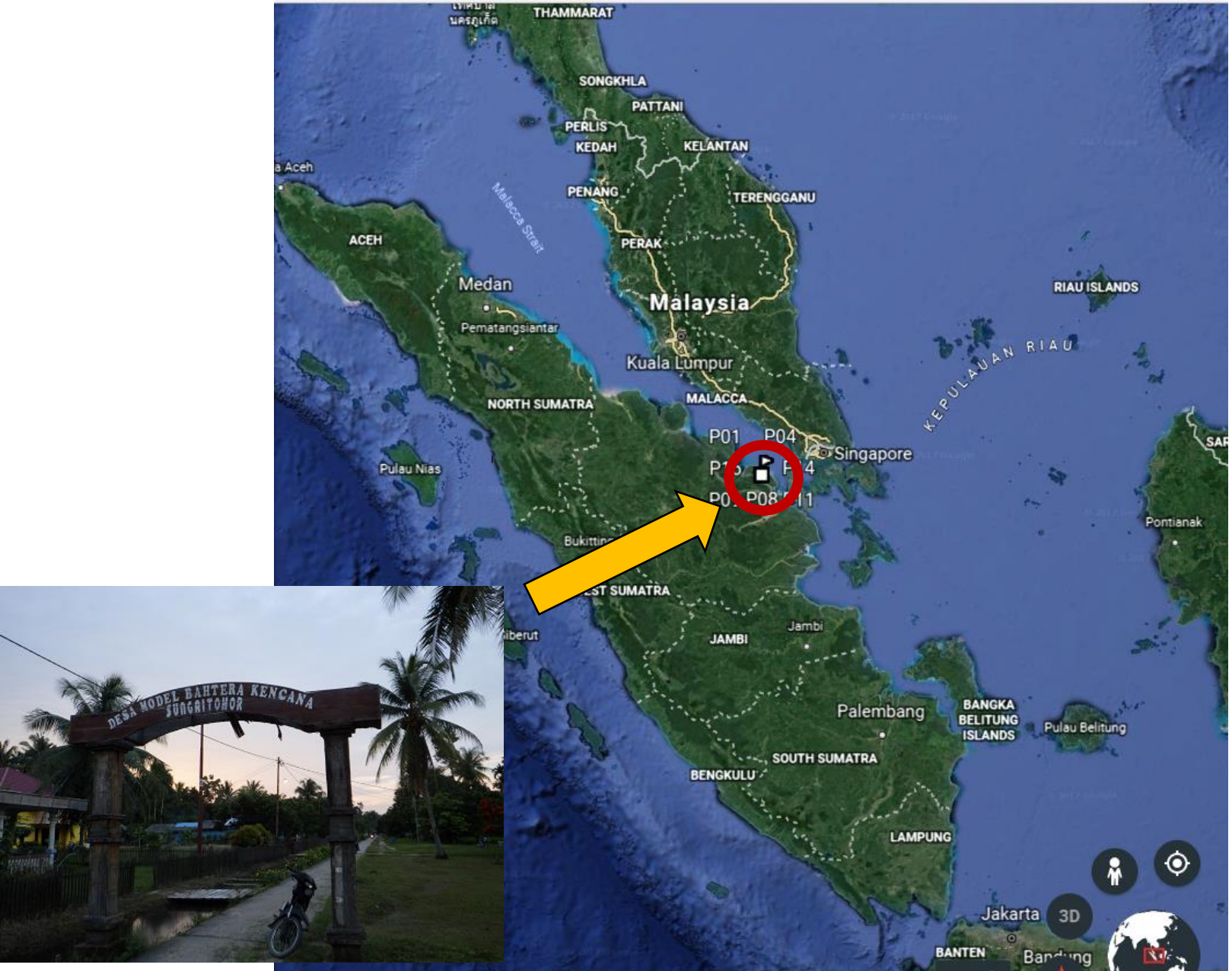
After transplanting: about twice a year

No fertilization and No sucker control

The owners decide harvest timing by flower bud formation

→Little or no maintenance is carried out after planting

Sago Cultivation in Tebing Tinggi Island, Riau



History of sago cultivation in research site

1980s Sago cultivation was started

2005 Small canal was built

2009 Large canal was built and connected→**Peatland was drained**

Productivity of sago palm in the village had declined significantly

(lower yields, increased mortality, and reduced growth rates of juvenile individuals: Sasaoka 2015)

2014 Massive Fire

Due to the fire extinguishing activities by villagers, sago cultivation is continuing.

Peatland with ferns growing after drainage and peat fire

History of sago cultivation in research site

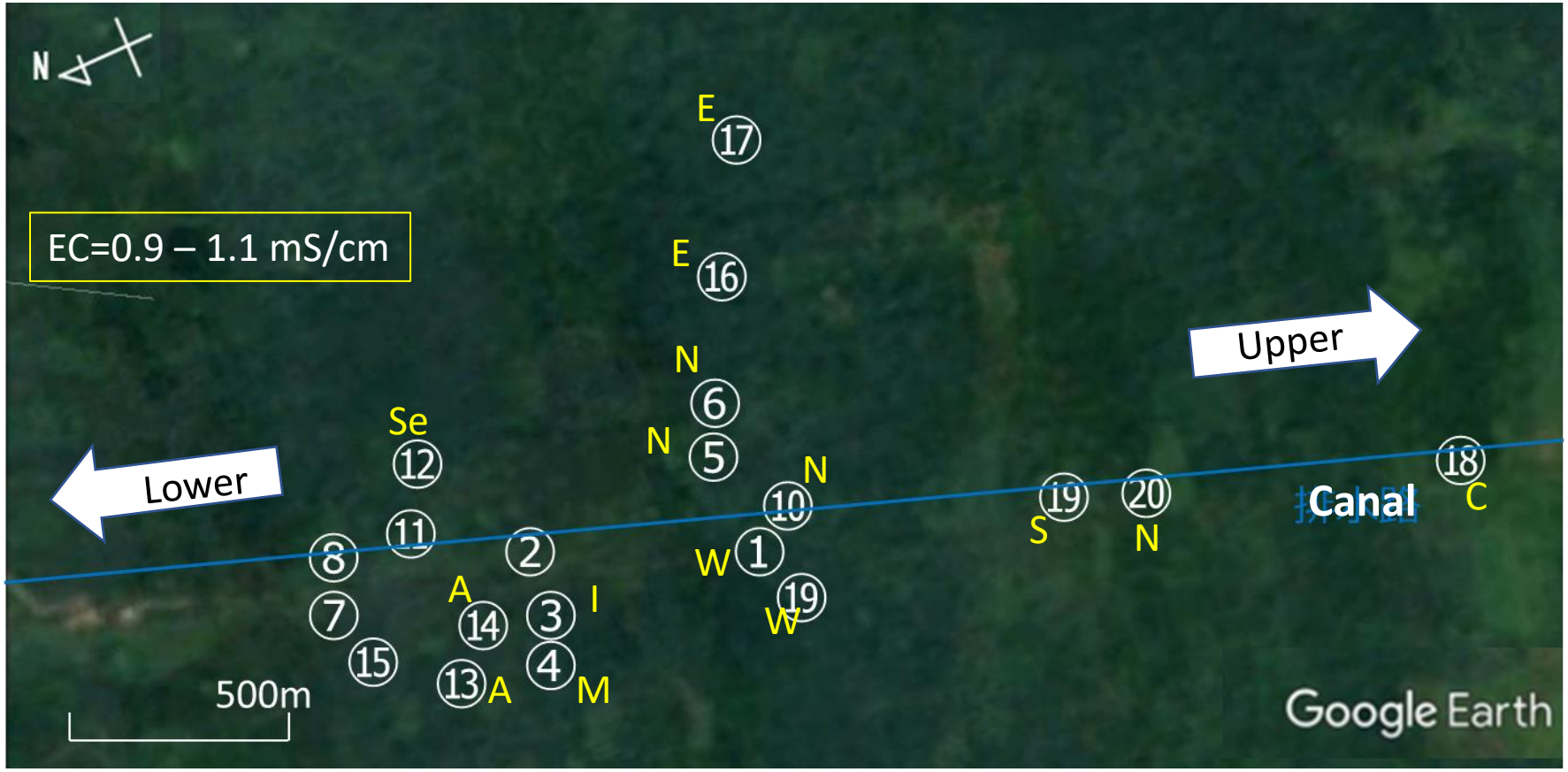
2015 Canal Blocking

Water level is kept high

Did sago palm productivity recover after re-wetted?

Owners of Small Holder's Sago Plantation (Plots location and Canal)

The average peat depth → 5.85 m, up to 8.70 m (Nasrul et al. 2020).
Peat depth → Thicker on the upper reaches of the canal (KLHK 2015).

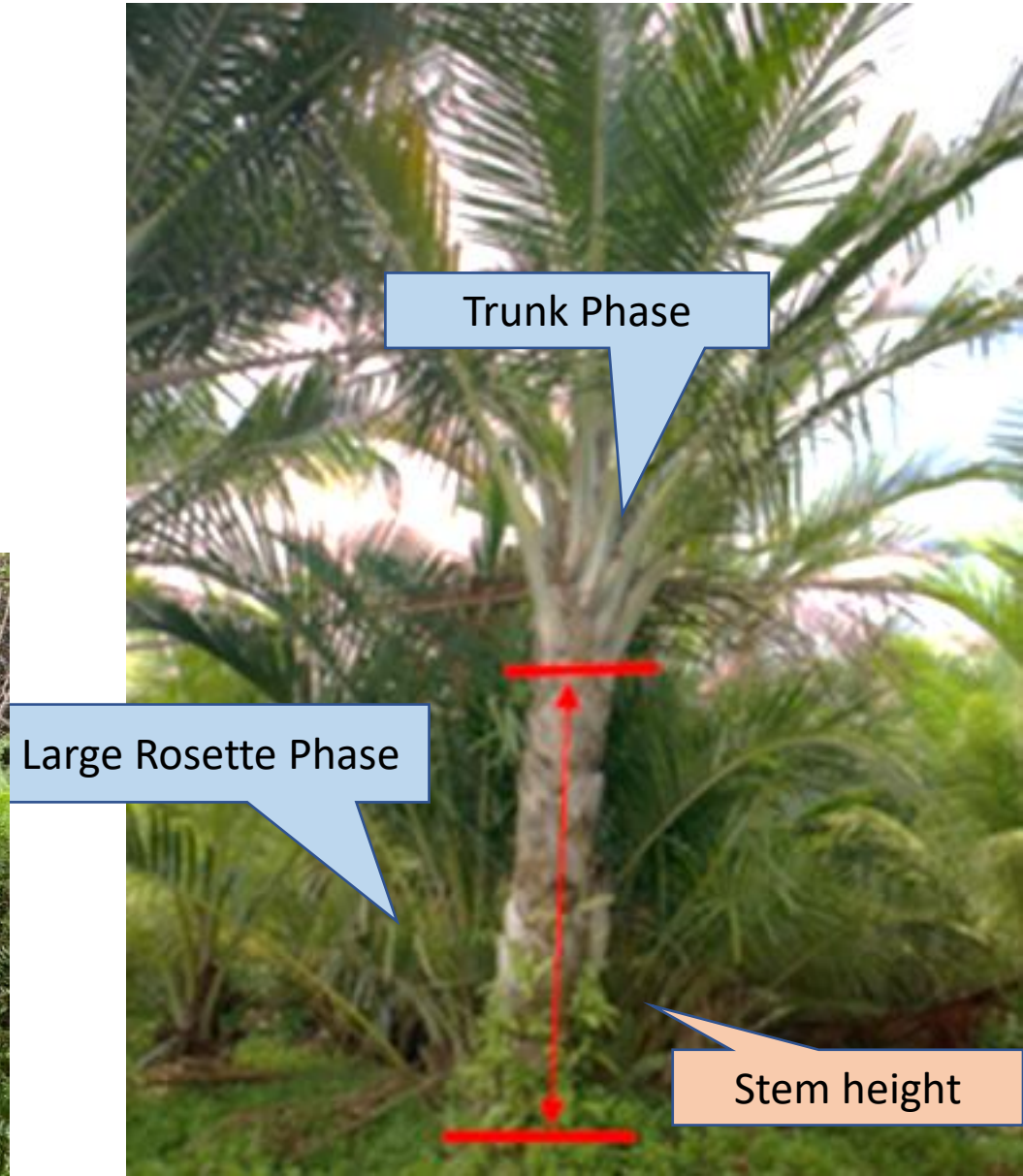


Sago Census

Trunk Phase (Trunk Height >2m)
→ Trunk height and dbh

Large Rosette Phase
(Trunk Height < 2m) →Count

Field Work
Nov. 2016, Nov. 2017, Mar. 2020



Measurement of harvest size

4 palms : Suitable size for harvest
(decided the harvest timing by Owner)

Annual sago yield comparisons

Jong FS. 2001. Sago production in Tebing Tinggi sub-district, Riau, Indonesia. Sago Palm 9:9-15.

→Before drainage (August 1999) by social economic surveys.

Annual harvested number of trunks

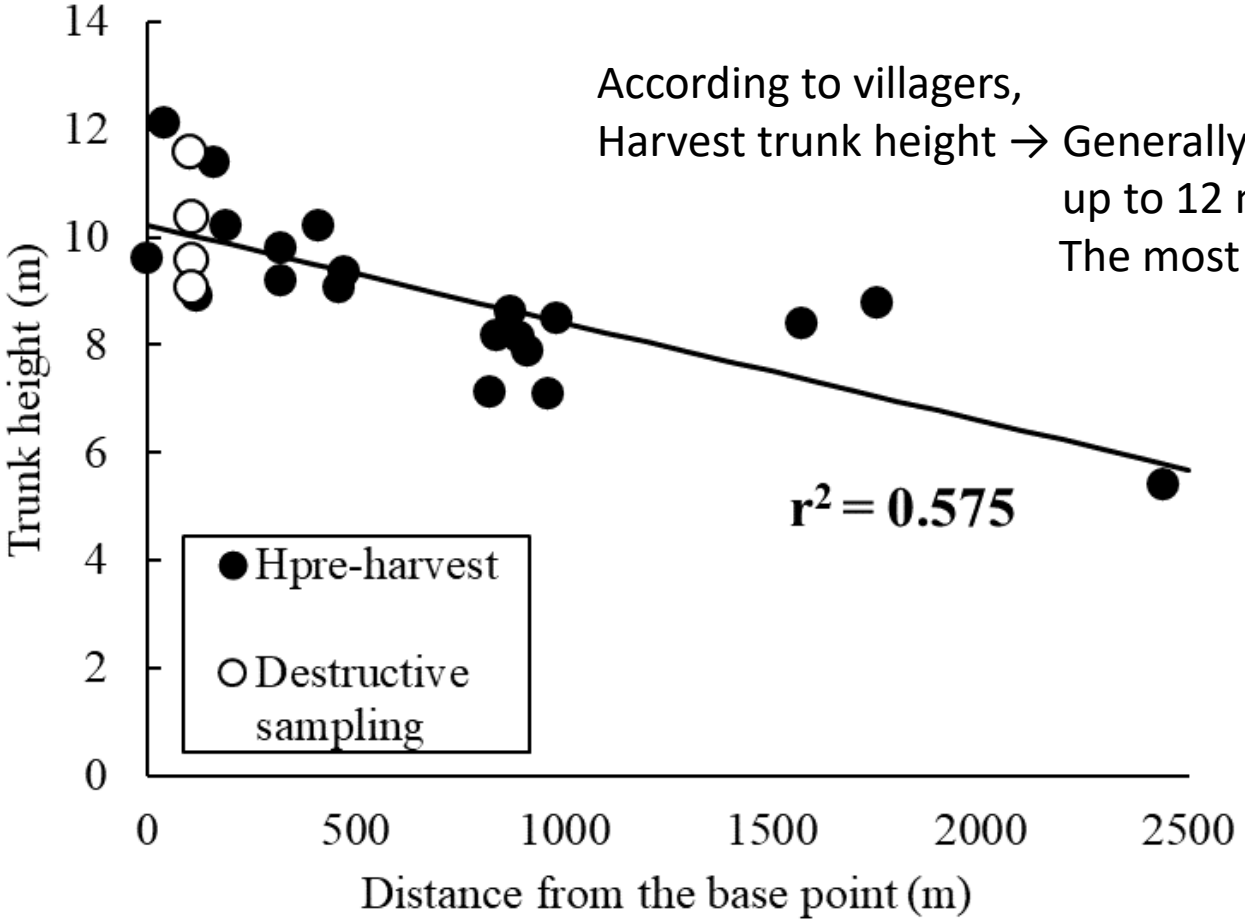
(27 smallholder sago farmers)

Trunk height at harvest

(5 groups of sago harvesting workers)

Results

Relationship between estimate maximum trunk height and environmental condition



According to villagers,
Harvest trunk height → Generally 7-10 m,
up to 12 m,
The most upstream 5-6m

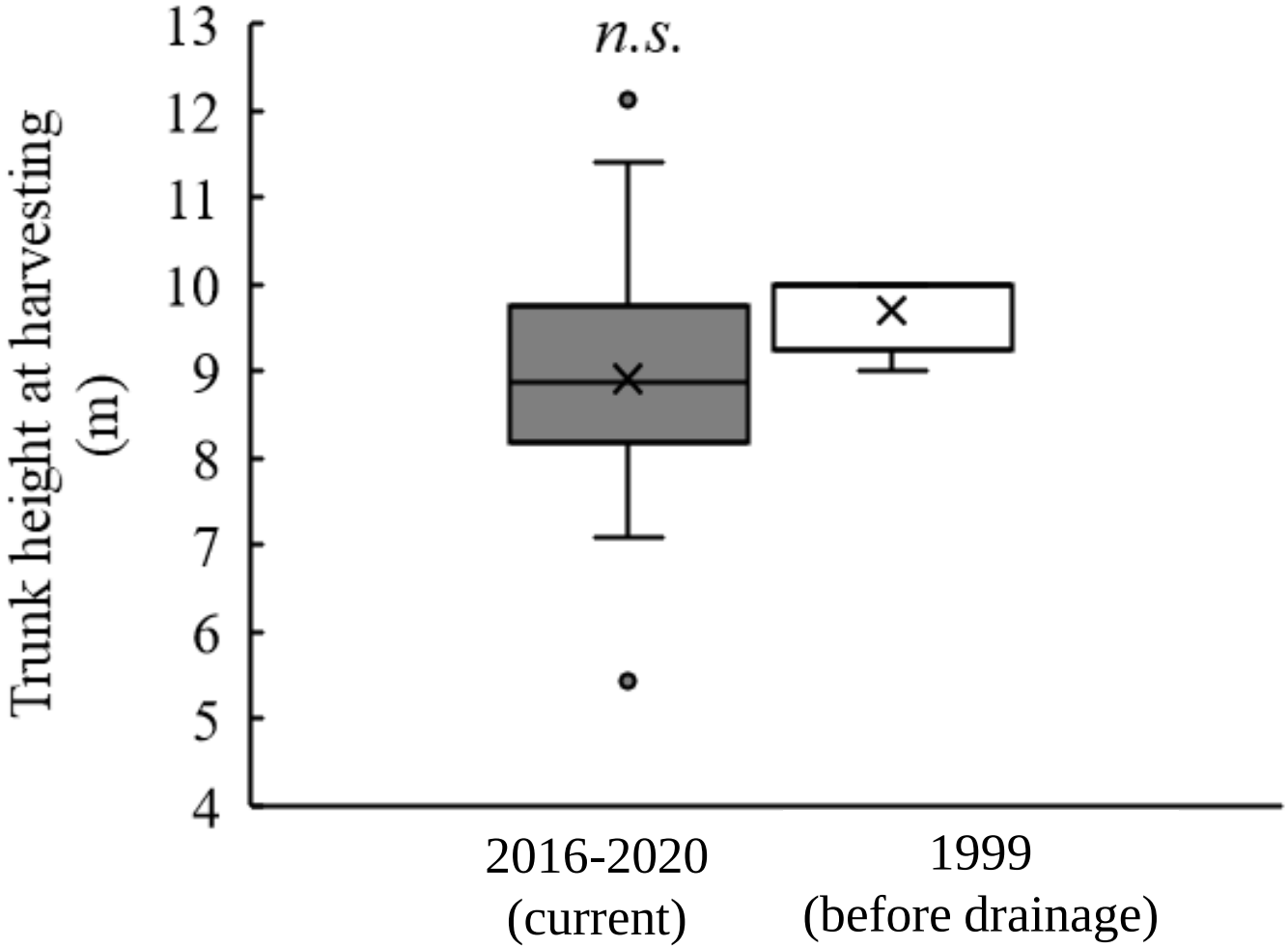
(Monda et al. submitting)

Shallower ⟷ Ticker

The thicker the peat thickness, the smaller the maximum trunk height

Results

Comparison of harvest size



(Monda et al. submitting)

Sago palm cultivation recover harvest size by re-wetting

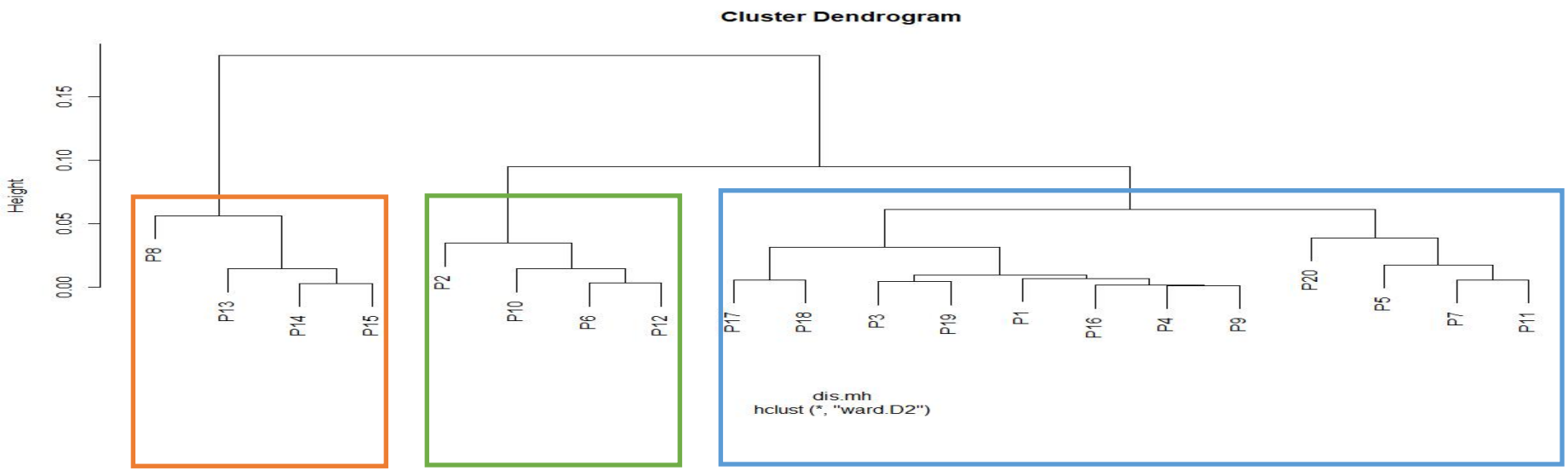
Comparison of sago yield

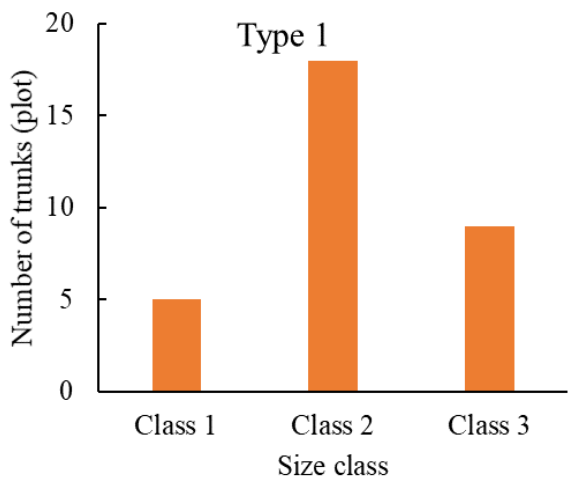
	No. of survey plots	Annual harvested trunks (max-min)
2016-2020	16	26.8 (7.2-67.5)
1999	27	26.0 (5.6-53)

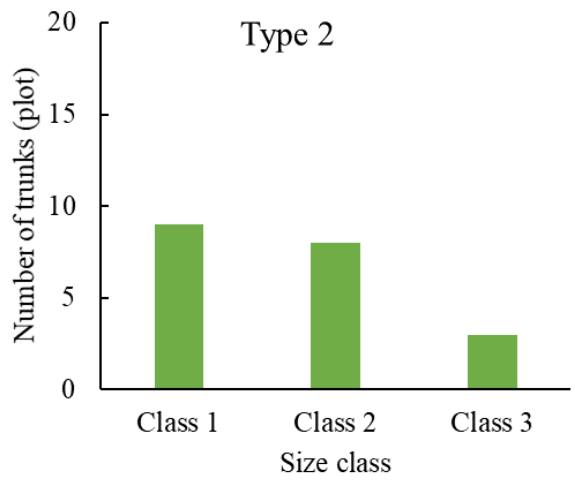
(Monda et al. submitting)

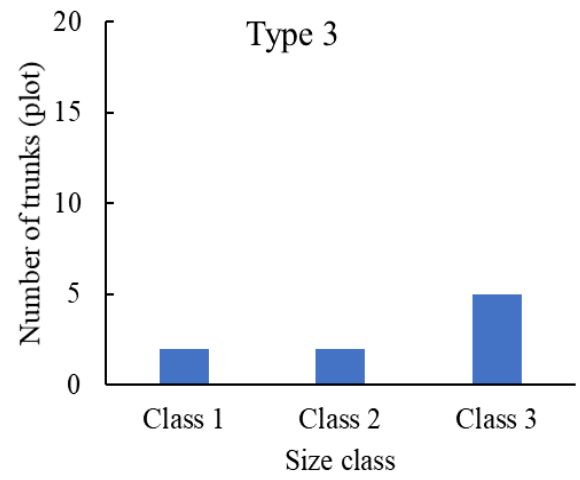
Sago palm cultivation recover annual sago yield by re-wetting.
Large variation in the annual trunk yields

Forest structure of sago palm cultivation







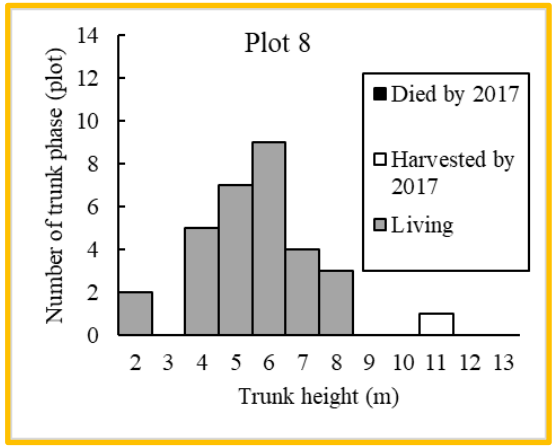


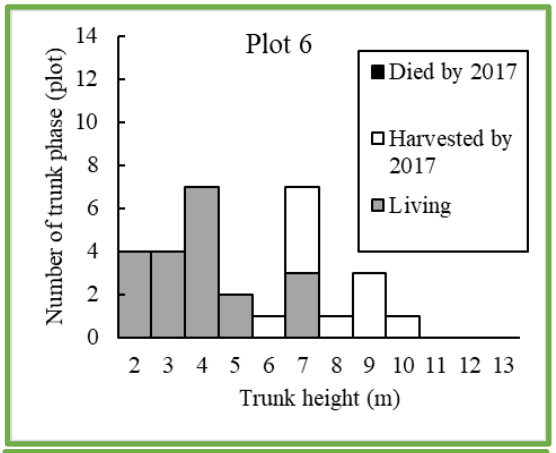
(Monda et al. submitting)

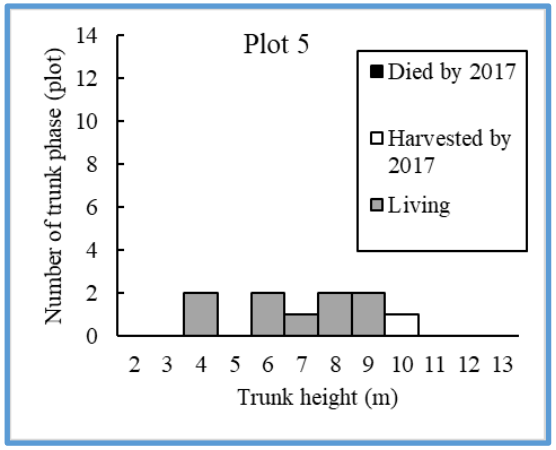
Results

Type 1 | Type 2 | Type 3

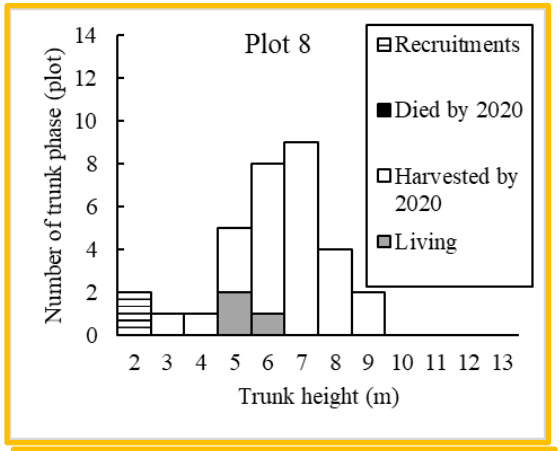
2016

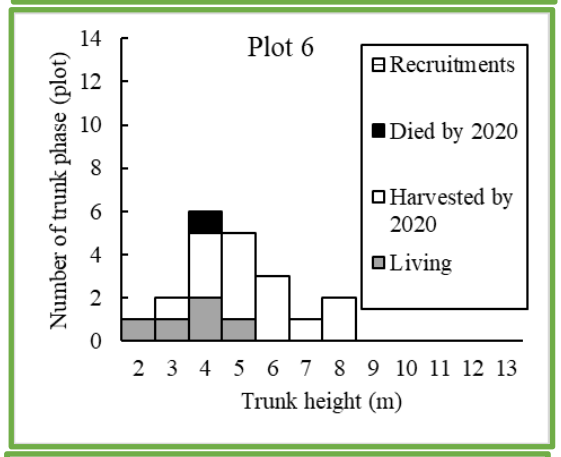


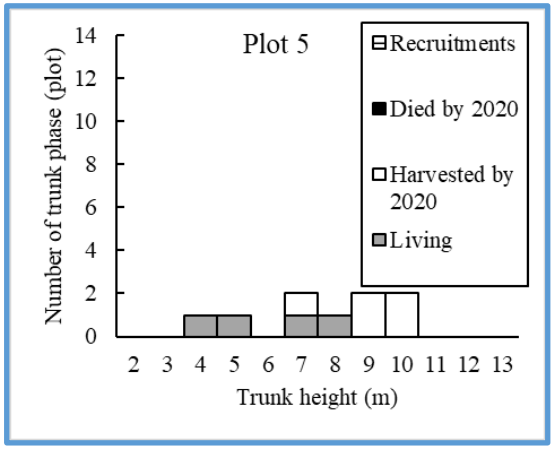




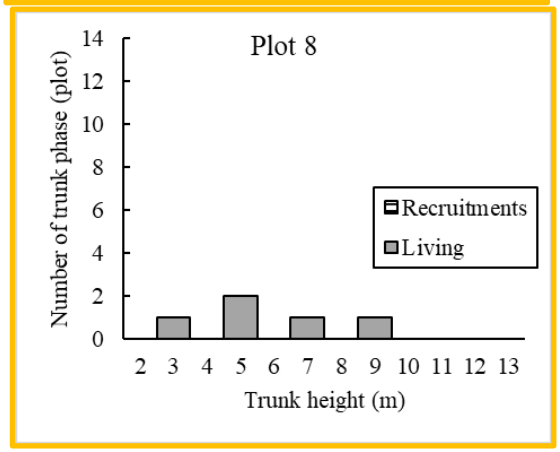
2017

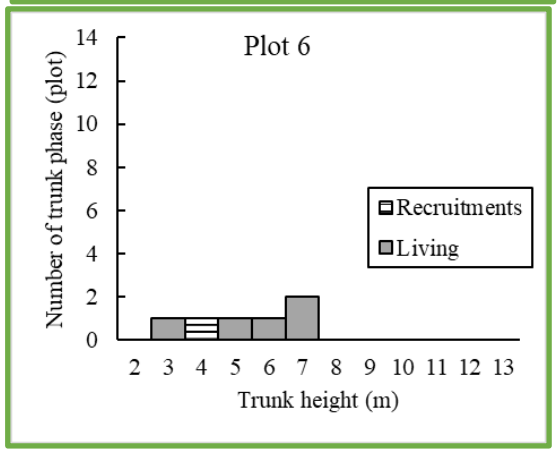


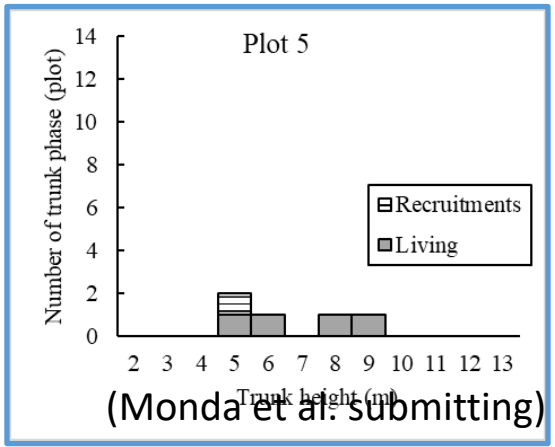




2020

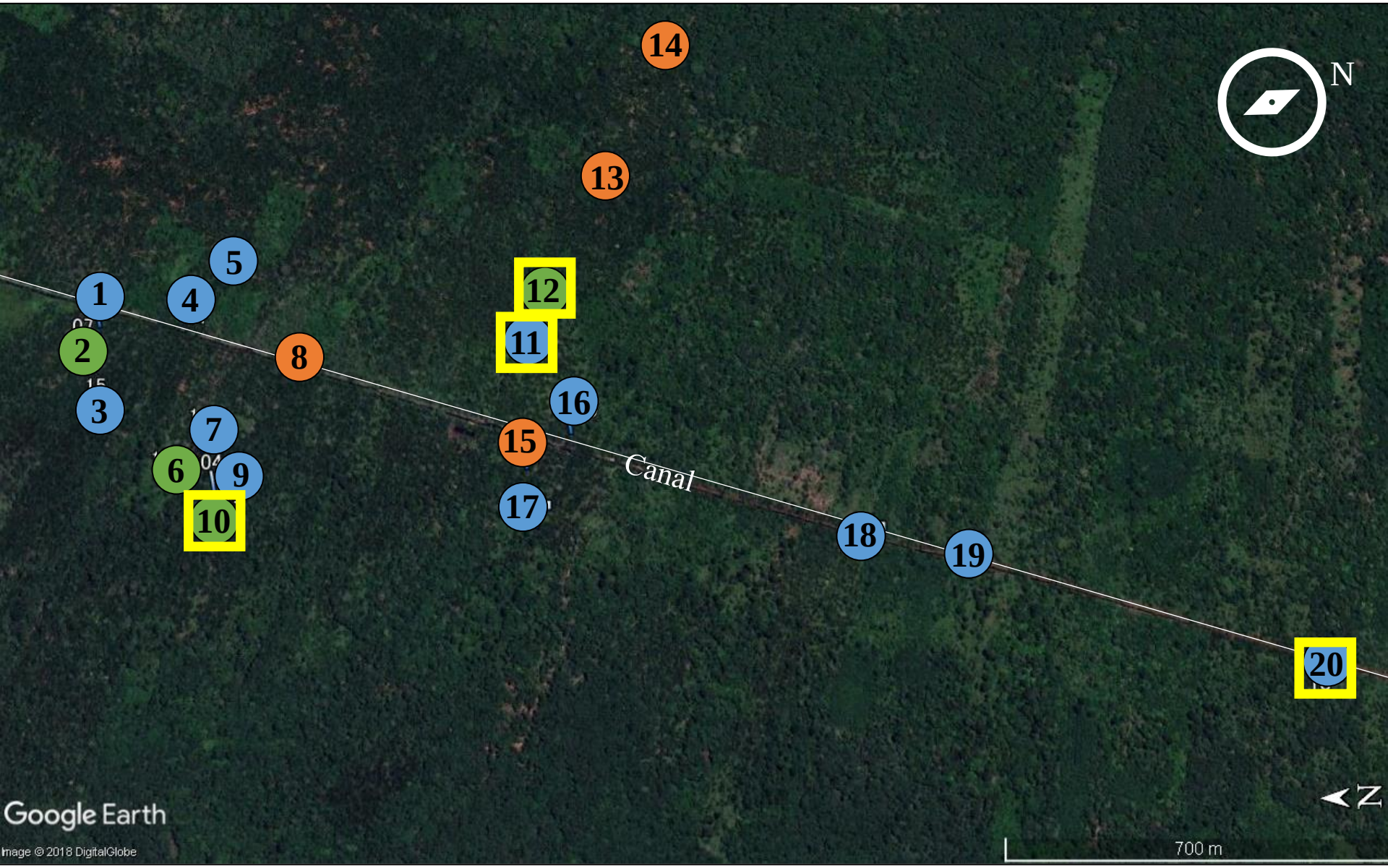






(Monda et al. submitting)

Results



(Monda et al. submitting)

Sago productivity recovering?

→Yes

Harvest size and number of harvested palms has recovered to the same level as before drainage.

→Yield varies from year to year

Characteristic of smallholder's plantation.

To assess forest dynamics of sago palm, long-term surveys and plots that cover a variety of forest structures are important.

Annual yields

Variations in the number of harvested palms, and low number of harvested palms can be improved by proper management (Jong 2001 and Yanagidate et al 2009).

High number of harvesting is difficult achieve alternate year harvesting (Sato 1986).

The choice of feasible management is important

Acknowledgement

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