

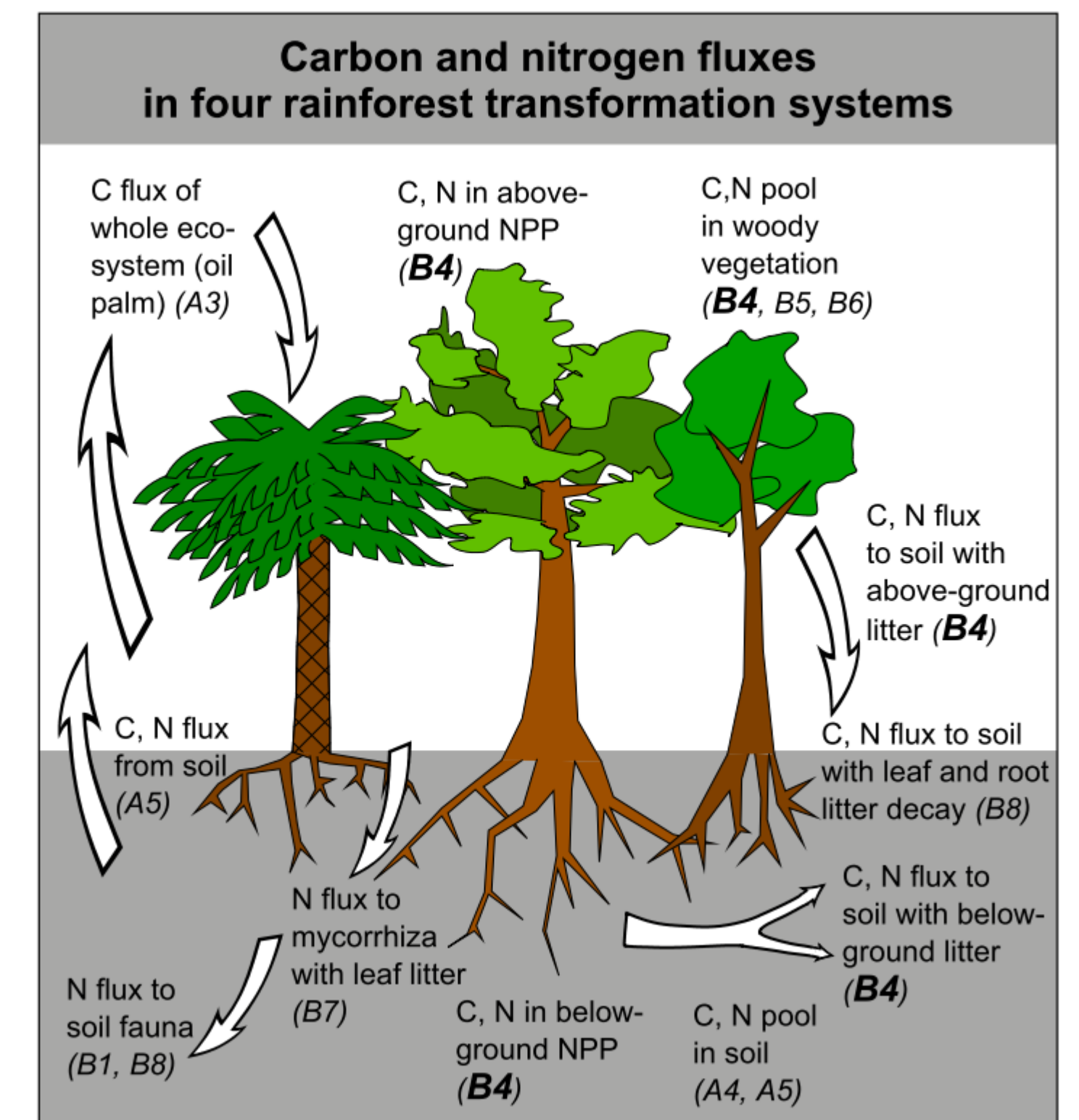
## B04

### Carbon sequestration, litter C input to the soil, and resource use-efficiency in lowland rainforest transformation systems on Sumatra (Indonesia)

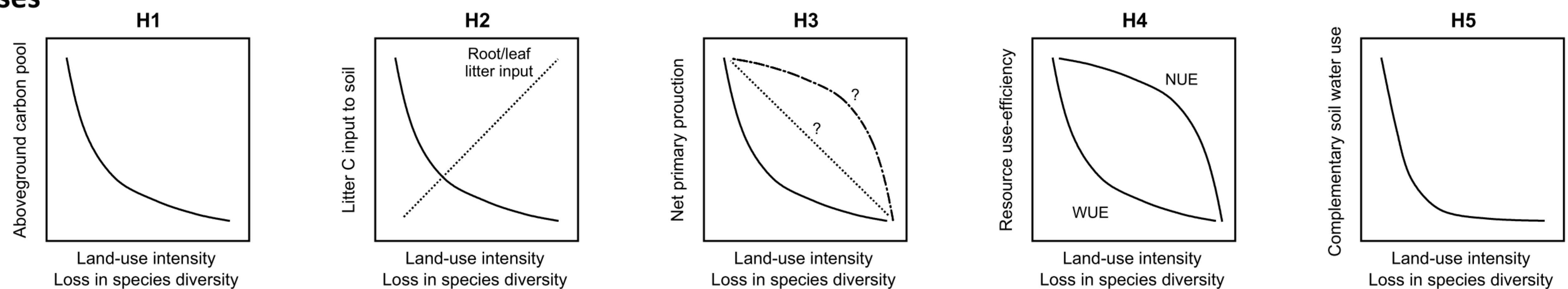
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#### Research aims

- Carbon (and nitrogen) pools in aboveground woody biomass of these forest systems as dependent on woody species diversity and identity
- Supply of aboveground *versus* belowground (root) litter as sources of soil organic carbon (SOC)
- Above- and belowground net primary production and related carbon fluxes of the different forest types
- Stand-level estimates of water and nitrogen use-efficiency (jointly studied together with A02 and A05)
- Significance of vertical root segregation of different woody species for complementary soil water uptake in the different forest transformation systems (jointly studied together with A02)



#### Hypotheses



- H1** The carbon pool in aboveground woody biomass is mainly determined by the naturalness of the system.
- H2** The litter C input to the SOC is higher in more natural/diverse systems than in more intensively managed/less diverse systems; the ratio of root to leaf litter C input increases with increasing degree of forest transformation.
- H3** Above- and belowground net primary production differ significantly between the transformation systems.
- H4** The stand-level water and nutrient use-efficiency (WUE, NUE) decrease with increasing land-use intensity.
- H5** Systems with more diverse woody species composition show complementary soil water usage due to vertical root segregation.

#### Methodology

##### Inventory of aboveground woody biomass and carbon stocks

(field work completed)

- Tree height and diameter, wood density
- All trees/palms > 10cm dbh on all 32 plots
- In 2 subplots all trees > 2 cm dbh



##### Annual above-ground primary production

- Litter fall and C and N transfer to the soil (litter traps ongoing)
- Stem diameter growth (natural rainforest and rubber systems), height growth of oil palm individuals, litter production and oil palm fruit yield (ongoing)

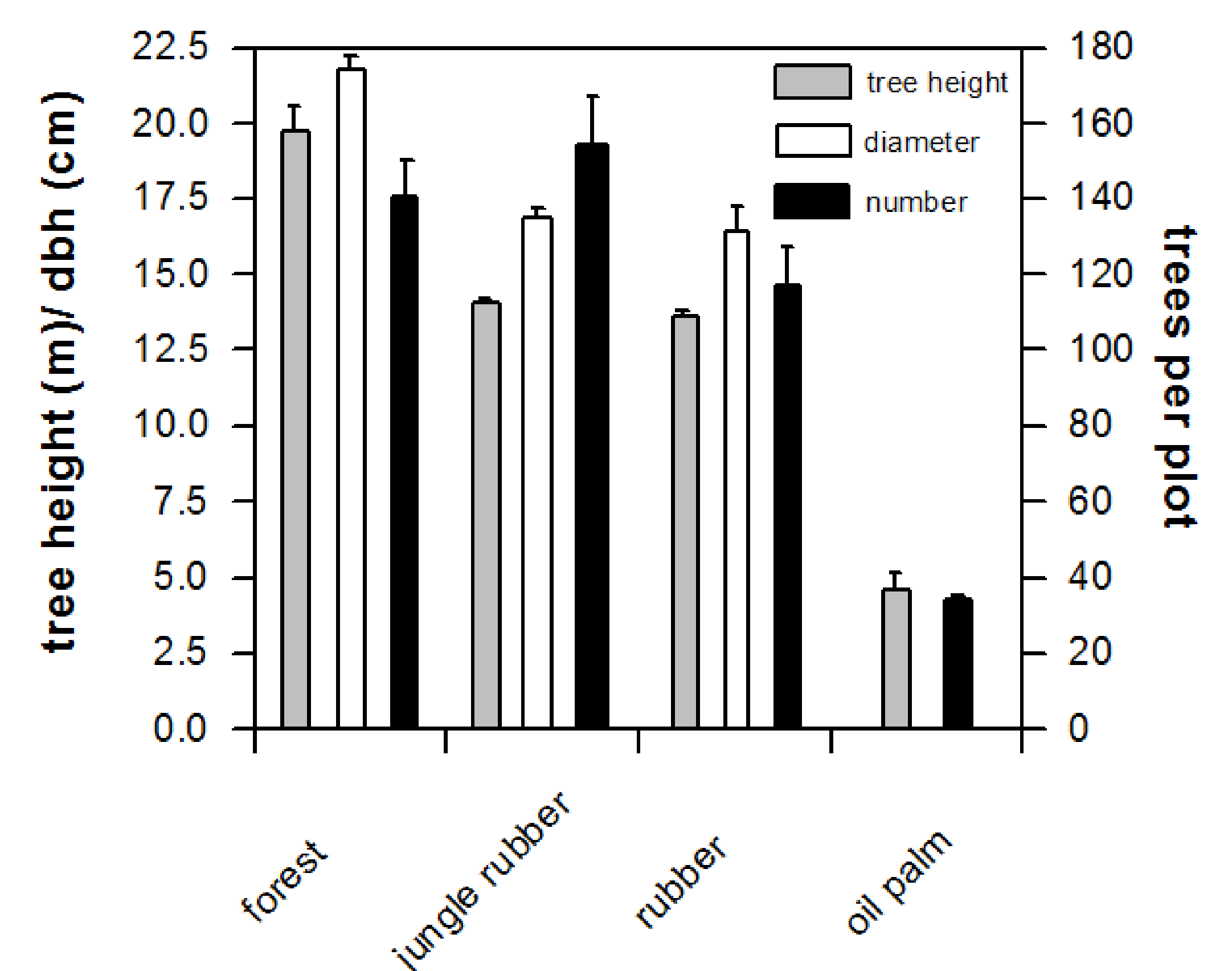


##### Belowground litter production and C and N transfer to the soil

- minirhizotron technique (started)
- sequential soil coring approach (lab work ongoing)
- ingrowth core approach (installed)



#### Preliminary results



Structural features of trees in transformation systems; grey bars indicate mean tree height, white bars tree diameter and black bars tree/palm number per plot in 8 forest, jungle rubber, rubber and oil palm plots ( $n_{\text{total}} = 32$ ).