



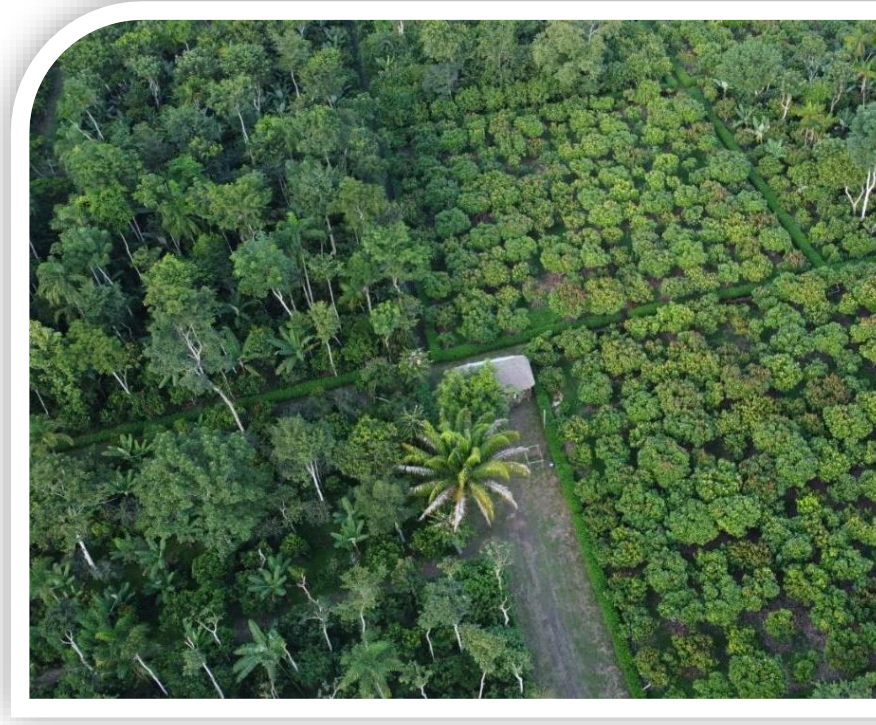
Measuring labour time and implications for the management of tropical cacao AF systems (SysCom Bolivia)

Chigusa Keller, Johanna Rüegg | FiBL Open Day – 27. November 2024

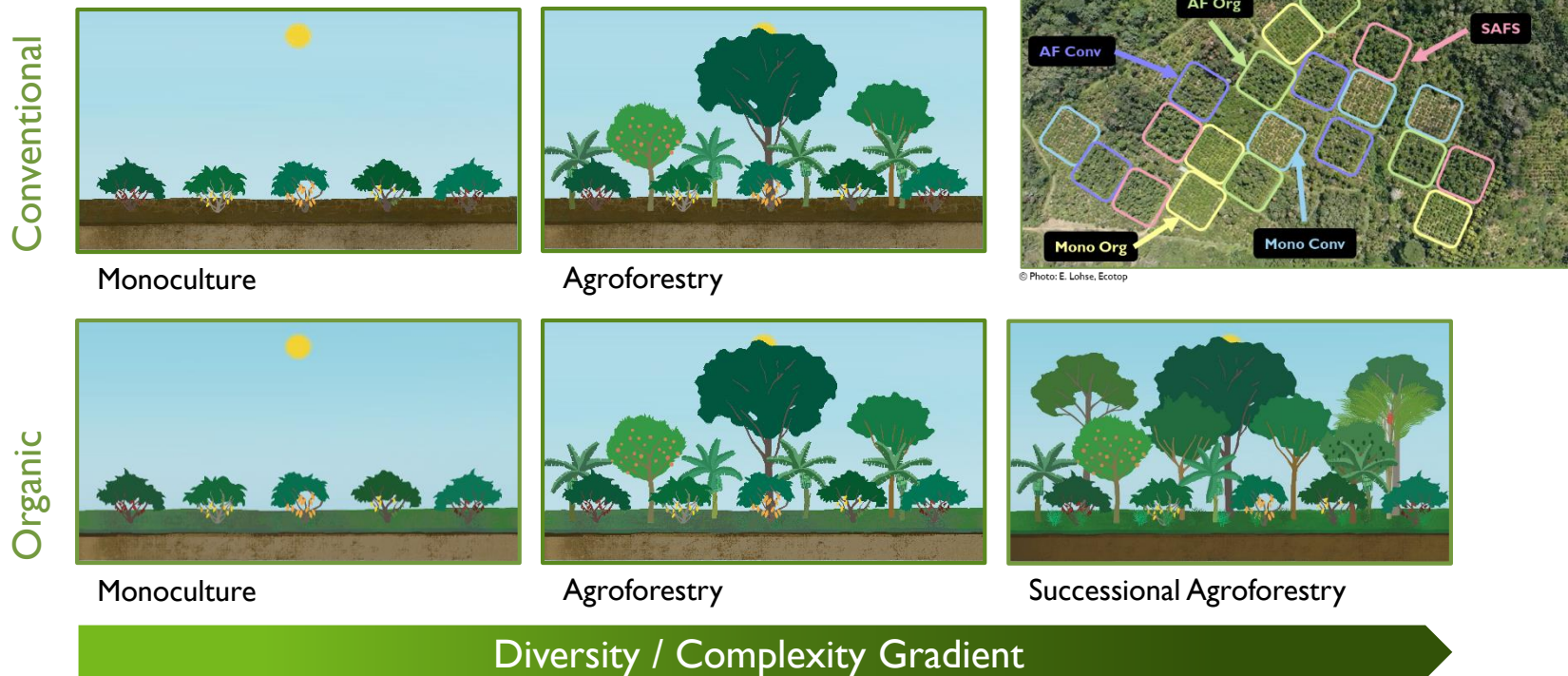
SysCom Bolivia - Trial Objectives

Long-term comparison of different cacao production systems' agronomic, economic and ecological performance (since 2008).

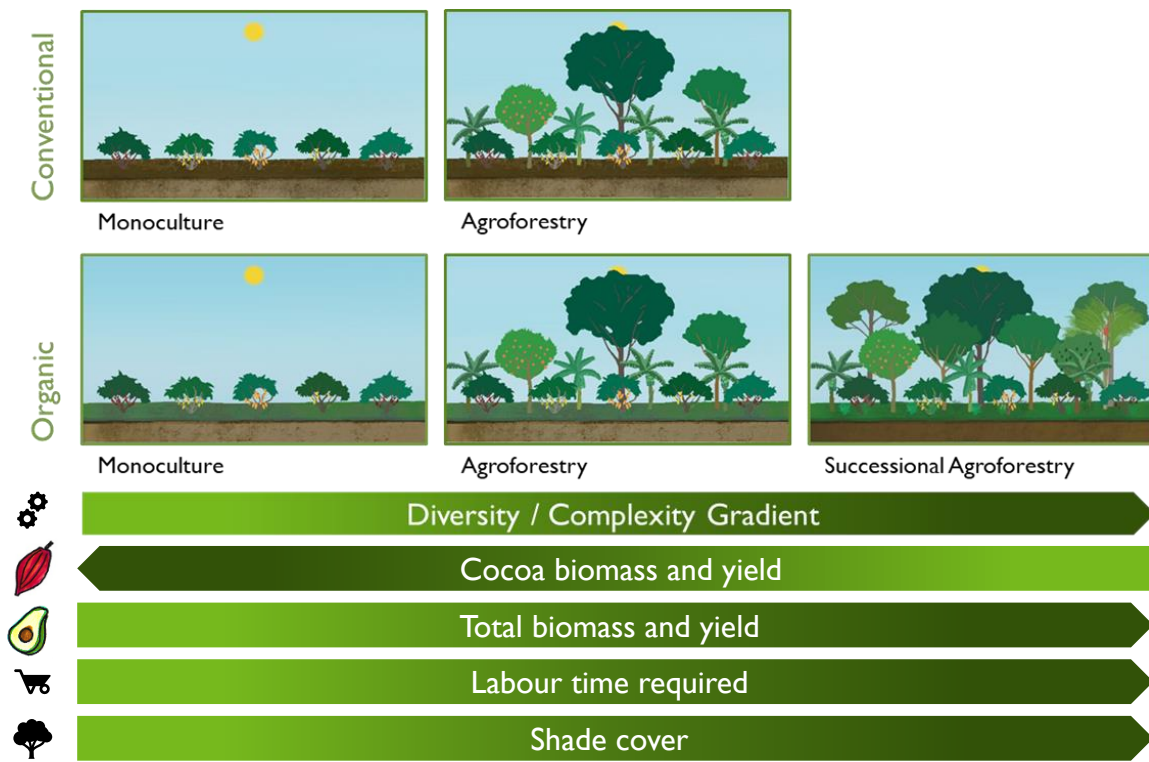
Management: conventional vs. organic
System: monoculture vs. agroforestry



Cacao production systems in the trial



Gradients along the systems in the trial



Method

Material needed:

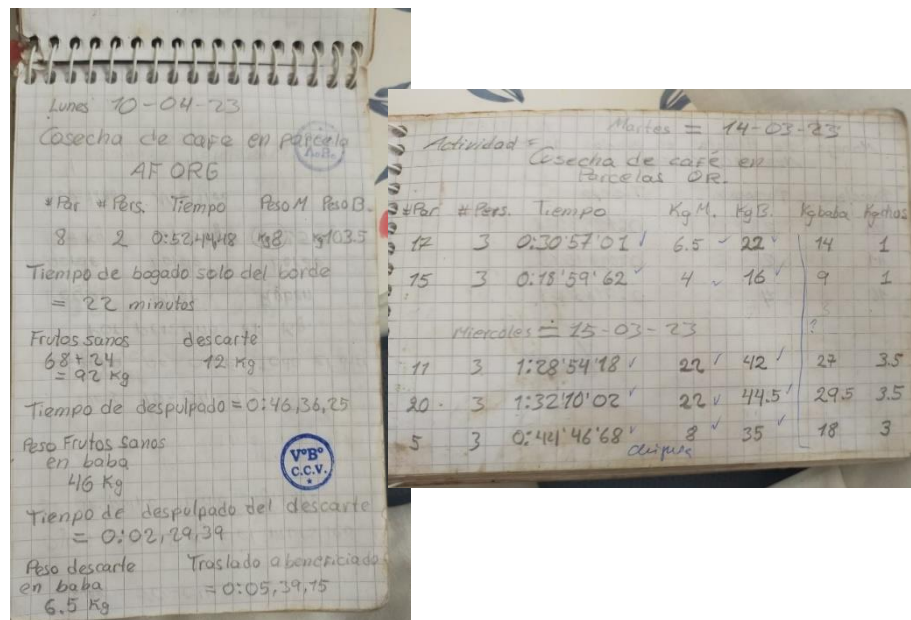
- stop watch
- field book or data sheet

Method:

- measure the time for each activity
- important: clearly defined protocol
- data entry, compiling data, some additional calculations & data quality check



From field to final data set



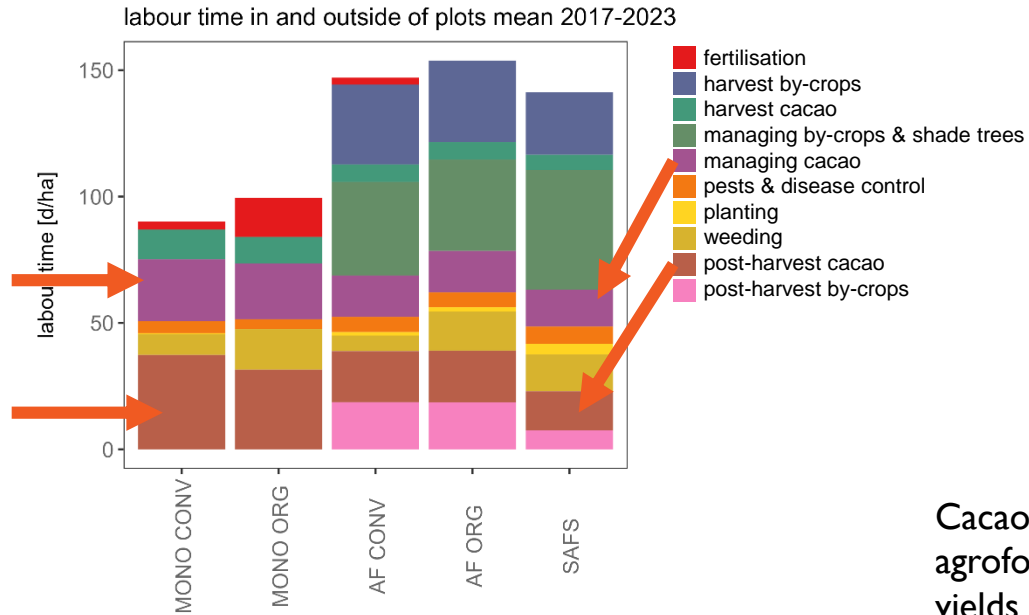
(example from coffee harvesting data 2023)

time measured

no. of workers

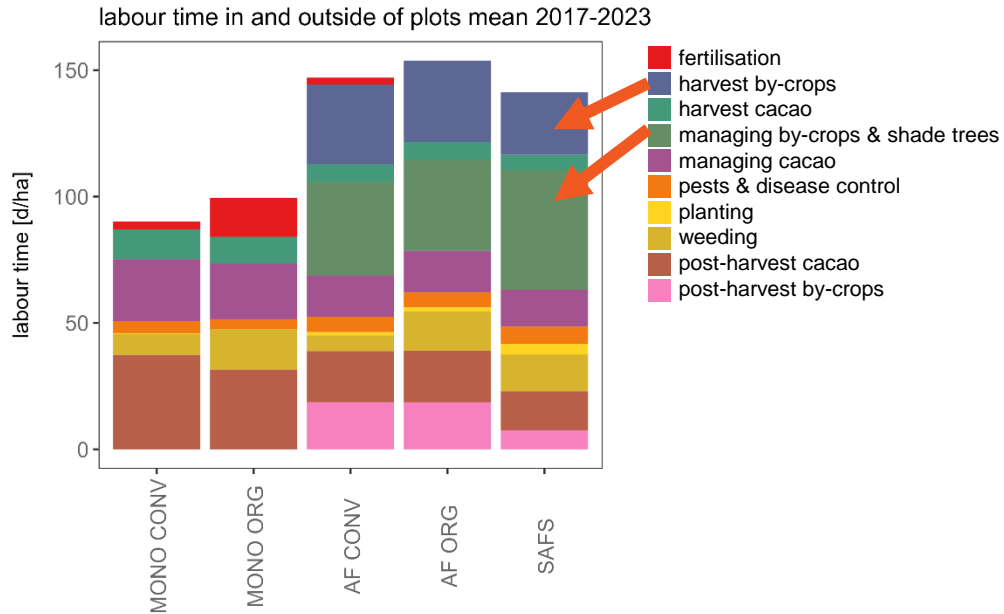
| | A | B | C | D | E | F | G | H | I | J |
|----|----------|------------|-----|------|---------|---------|-----------------|-------------------|------------------------|--------------------|
| | Producto | Fecha | Mes | Año | Parcela | Sistema | Numero personas | Muestreo /Bordura | Tiempo laboral muestre | Peso muestreo (kg) |
| 1 | | | | | | | | | | |
| 56 | coffee | 24.04.2023 | 4 | 2023 | 17 | SAFS | 5 | bordura | 00:29:22.79 | 7 |
| 57 | coffee | 24.04.2023 | 4 | 2023 | 17 | SAFS | 5 | muestreo | 00:24:58.18 | 6.5 |
| 58 | coffee | 24.04.2023 | 4 | 2023 | 15 | SAFS | 5 | bordura | 01:21:39.43 | 24 |
| 59 | coffee | 24.04.2023 | 4 | 2023 | 15 | SAFS | 5 | muestreo | 00:30:55.12 | 10 |
| 60 | coffee | 24.04.2023 | 4 | 2023 | 1 | SAFS | 5 | bordura | 00:40:56.54 | 13 |
| 61 | coffee | 24.04.2023 | 4 | 2023 | 1 | SAFS | 5 | muestreo | 00:11:53.88 | 3 |
| 62 | coffee | 24.04.2023 | 4 | 2023 | 9 | SAFS | 5 | bordura | 00:45:31.96 | 7 |
| 63 | coffee | 24.04.2023 | 4 | 2023 | 9 | SAFS | 5 | muestreo | 00:18:31.19 | 3 |
| 64 | coffee | 02.05.2023 | 5 | 2023 | 8 | AF ORG | 3 | muestreo | 01:25:03.71 | 19.5 |
| 65 | coffee | 02.05.2023 | 5 | 2023 | 8 | AF ORG | 3 | bordura | NA | 47 |
| 66 | coffee | 03.05.2023 | 5 | 2023 | 3 | AF CONV | 3 | muestreo | 01:34:58.00 | 23 |
| 67 | coffee | 03.05.2023 | 5 | 2023 | 3 | AF CONV | 3 | bordura | NA | 54 |
| 68 | coffee | 04.05.2023 | 5 | 2023 | 4 | AF CONV | 2 | muestreo | 02:02:10.31 | 18 |
| 69 | coffee | 04.05.2023 | 5 | 2023 | 4 | AF CONV | 2 | bordura | NA | 61 |
| 70 | coffee | 05.05.2023 | 5 | 2023 | 5 | AF ORG | NA | bordura | NA | 84 |
| 71 | coffee | 08.05.2023 | 5 | 2023 | 5 | AF ORG | 7 | muestreo | 00:48:24.99 | 27 |
| 72 | coffee | 08.05.2023 | 5 | 2023 | 11 | AF ORG | 6 | muestreo | 01:10:50.84 | 33 |

Insights from labour time data – system comparison



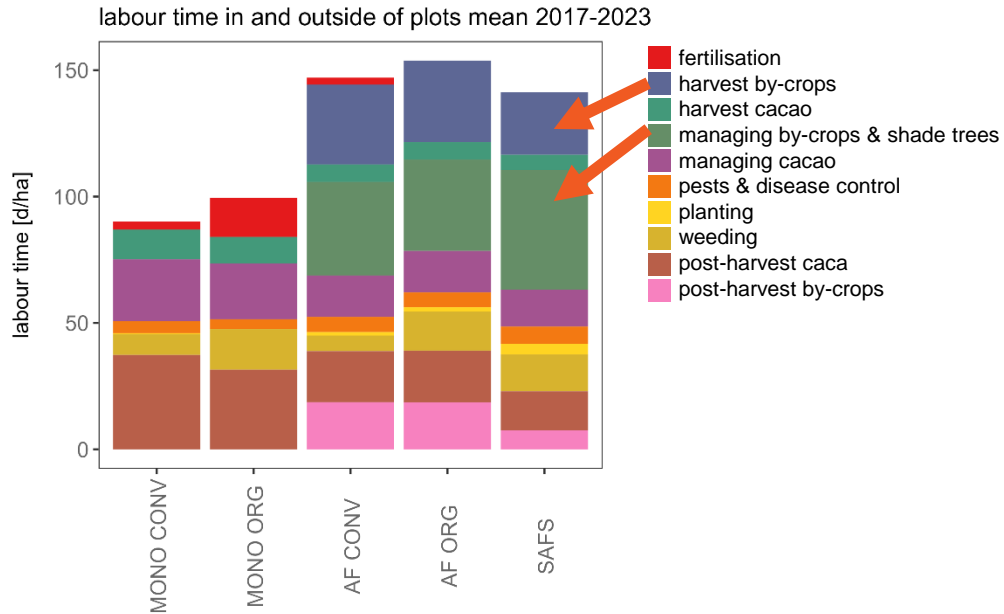
Cacao harvesting and pruning is less laborious in agroforestry systems. Relates to lower cacao yields and shadier environment.

Insights from labour time data – system comparison

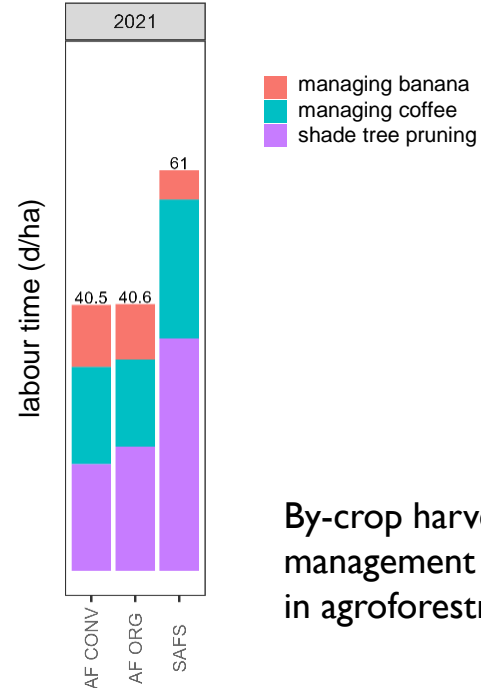


By-crop harvesting and management is time intensive in agroforestry systems.

Insights from labour time data – system comparison

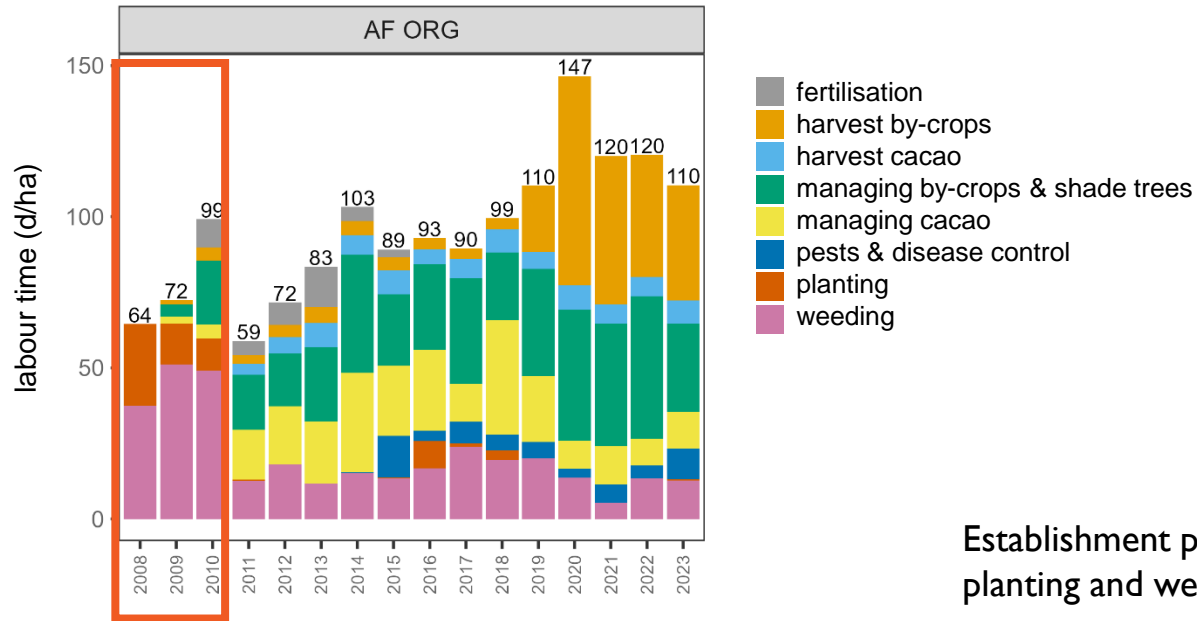


labour time for managing by-crops & shade trees

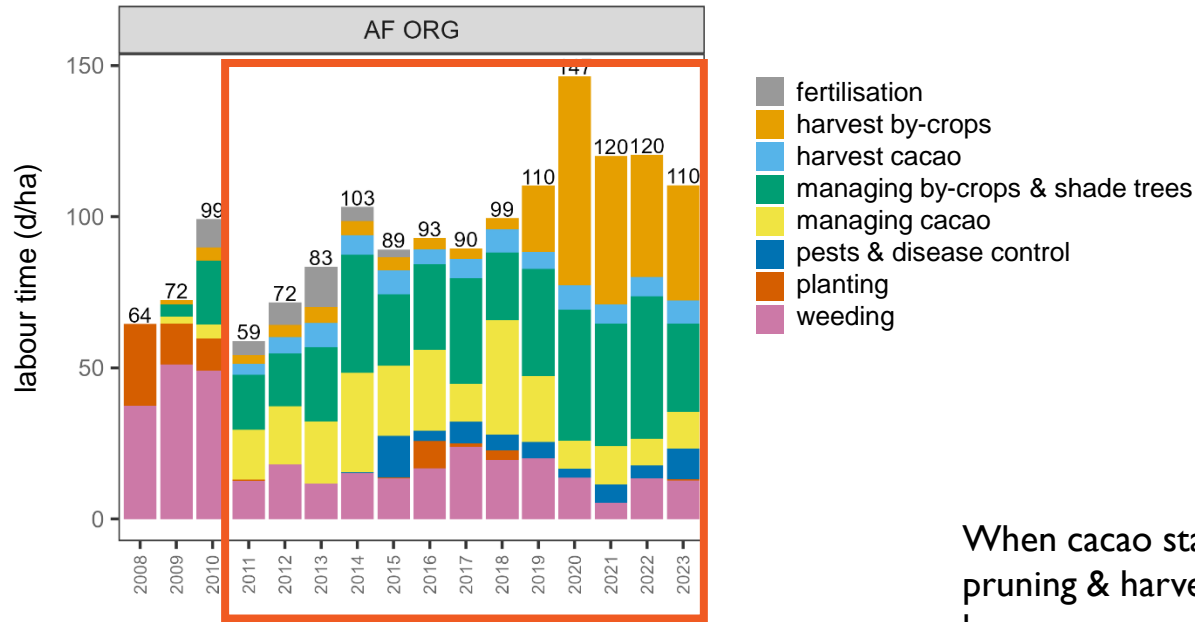


By-crop harvesting and management is time intensive in agroforestry systems.

Insights from labour time data – dynamics over time

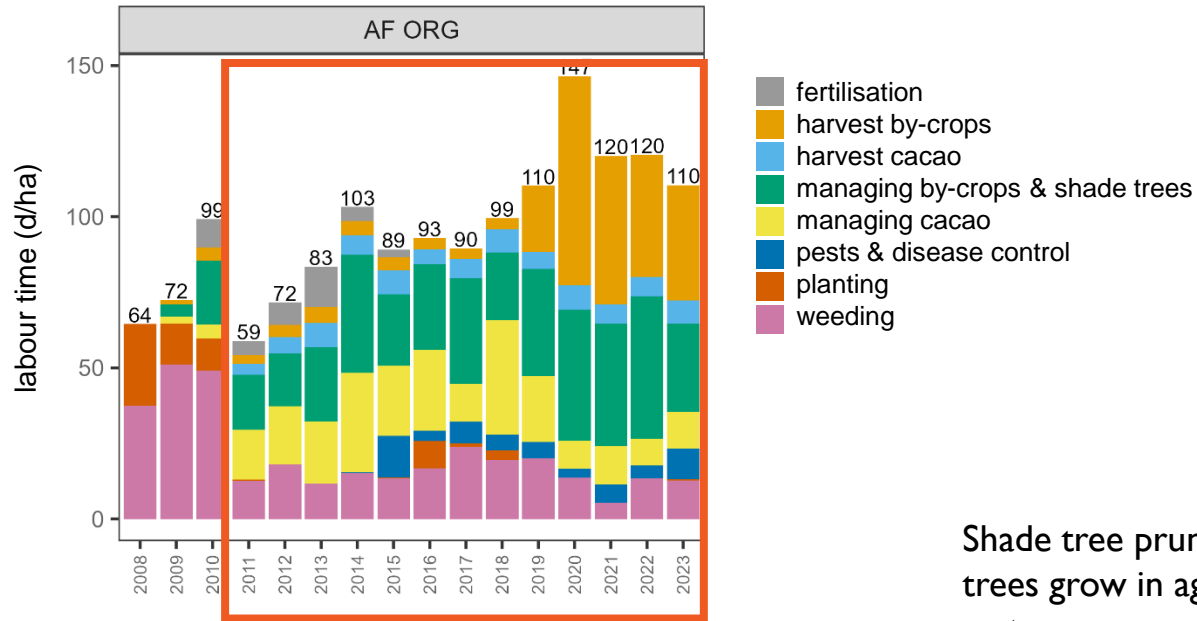


Insights from labour time data – dynamics over time



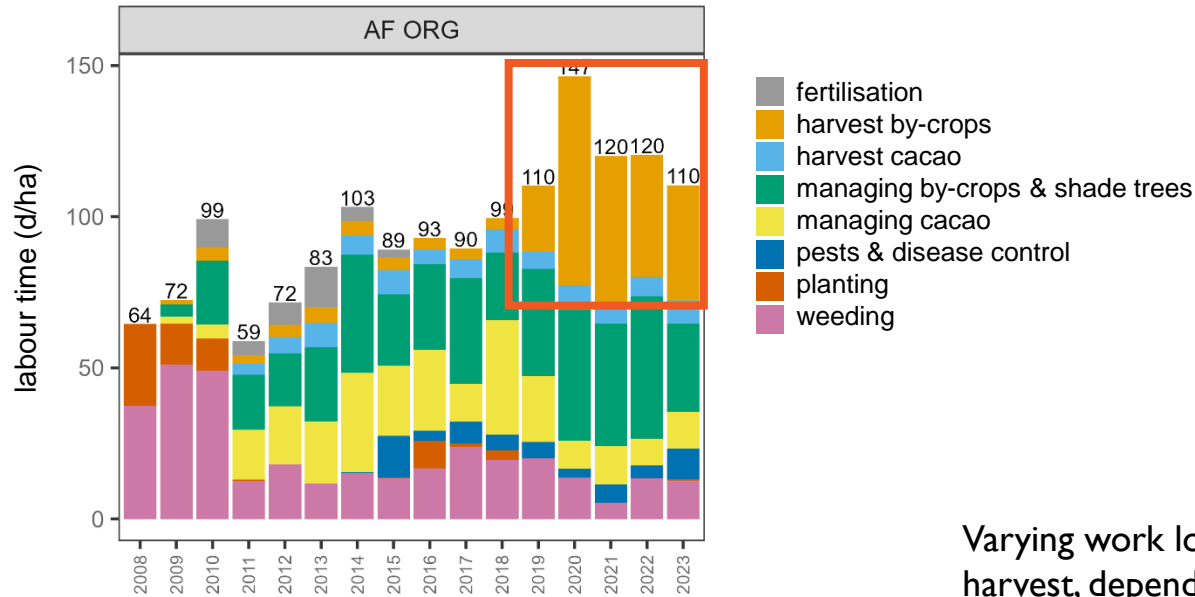
When cacao starts producing, pruning & harvesting work becomes more dominant.

Insights from labour time data – dynamics over time



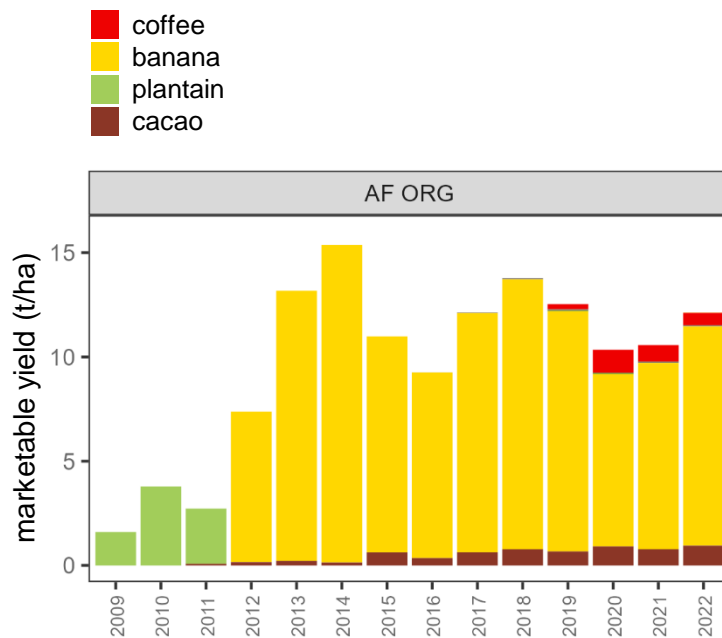
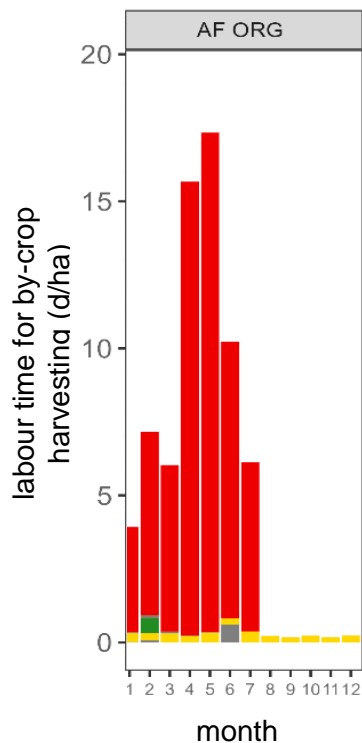
Shade tree pruning needed as trees grow in agroforestry systems.

Insights from labour time data – dynamics over time



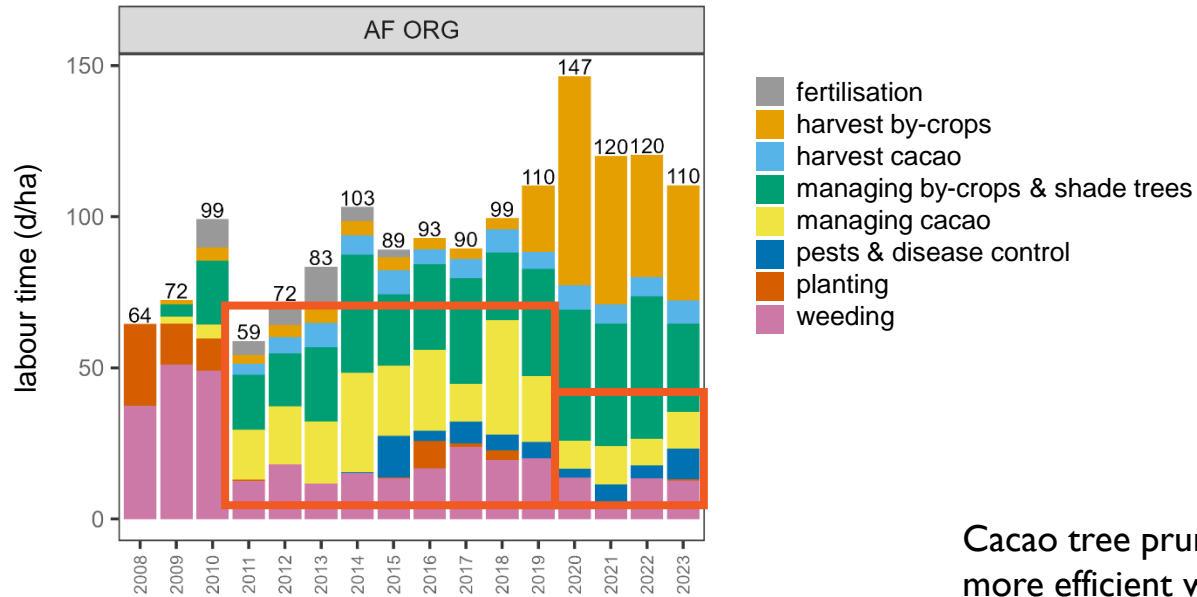
Varying work load for by-crop harvest, depending on the crops in production. (e.g. coffee started producing in 2019)

Insights from labour time data – by-crop harvesting



Coffee harvest requires a lot of work. Banana harvest is very efficient despite high yields.

Insights from labour time data – dynamics over time



Cacao tree pruning became more efficient with changing incentives for field staff.

Key findings with implications for labour time optimization

- Shade tree pruning in AF & SAFS systems is important but labour intensive. Reducing to one yearly pruning in AF should be possible without negative effect on yields.
- Temporal patterns for labour time requirement:
 - distinct labour time patterns depending on development stage of the system
 - increased efficiency with increasing experience and changing motivation of field staff
- The choice of by-crops has strong implications both on income from yield and costs for labour and both should be considered for the profitability of an AF system. (e.g. coffee, banana)

More on SysCom Bolivia & the Sara Ana Centre:



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Photo: Johanna Rüegg, FiBL

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Coop Sustainability Fund.



Local partners Bolivia

