Combining Genome-Wide Association Study (GWAS), Genomic Selection (GS) and agronomy to develop high-yielding, resilient cashew cultivars (*Anacardium occidentale* L.) in Benin

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Background

Overview

- Cashew is native from Brazil with global market: US $5.26 billion
- 42 % of global production by West Africa
- 2nd most exported crop in Benin after cotton: Nut export from **20 620 663 926 F CFA in 2022** to **67 959 131 090 FCFA in 2023** (DSA, 2023)
- 5.1% contribution to the agricultural GDP (MAEP, 2027)
- **Derivative products:** Roasted kernel; nut paste; apple jam; juice; ect.

Constraints

- **Low nut yield from aging plantations:** 475 kg/ha (Benin) ***≠ over 800 kg/ha (India) ≠ over 1 ton/ha (Vietnam) and (ivory coast)***
- Unavailability of improved varieties (CaBEV, 2016)
- Low quality and survival rate (23%) of seedlings (Babatunde et al., 2023)
- Insect pest attacks: 51% productivity loss (Agbongiarhuoyi et al., 2015)

Global objective

Support the growth of processing industries in the cashew sector in Benin and boost export revenue by developing high-yielding and resilient cultivars: **expectation of 300 000 tons by 2026**

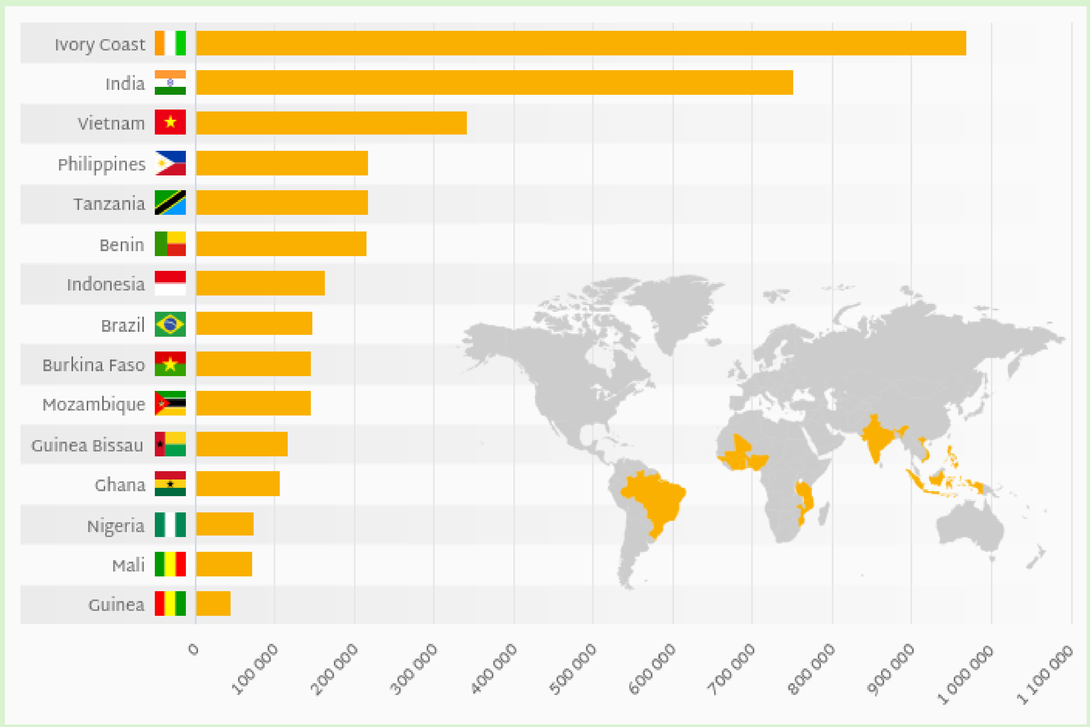


Figure 1. Annual production of cashew-producing countries in 2023; *Source: Faostat, 2023;* ***203 844 tons by Benin in 2023***

Materials & Methods

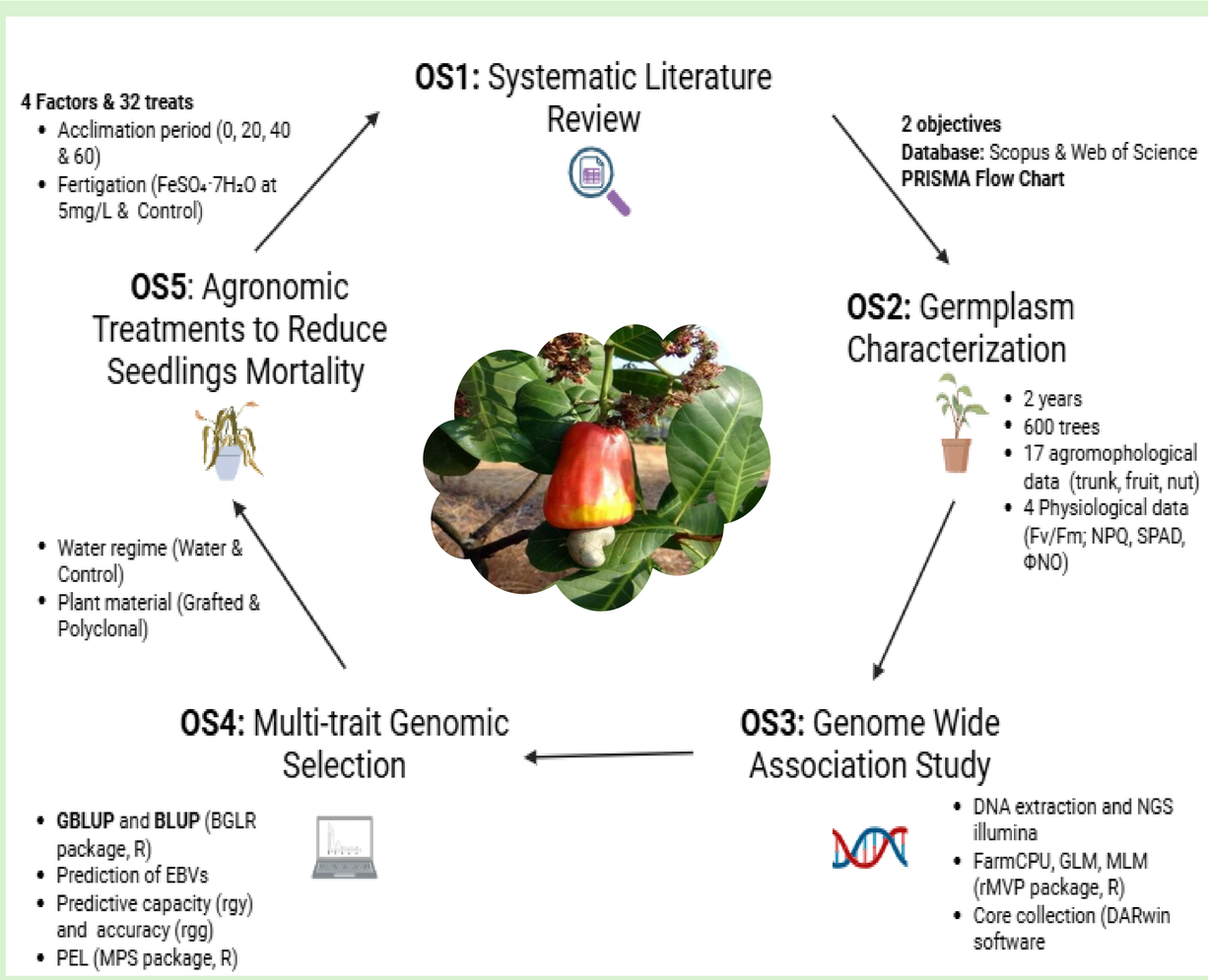
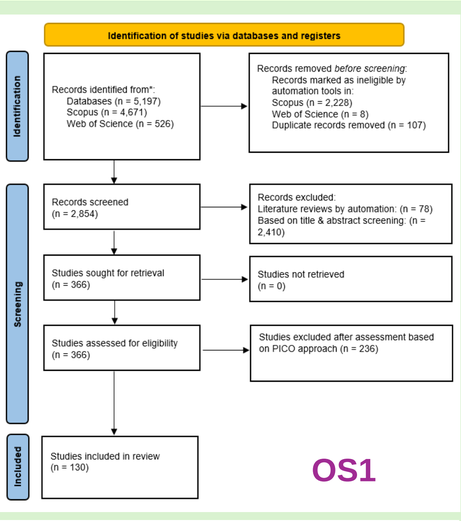


Figure 2. Methodological Roadmap for Research Objectives



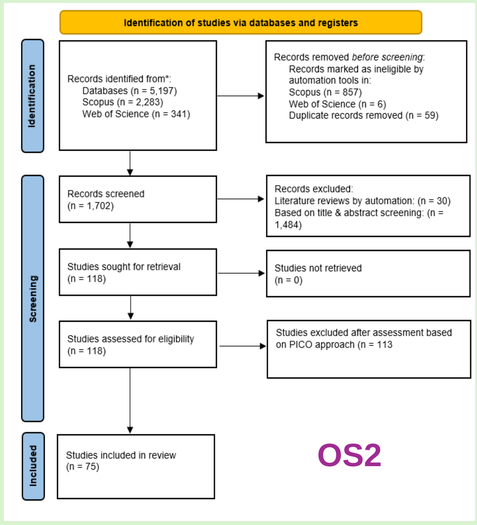


Figure 3. Prisma flow chart for ongoing Litterature Review

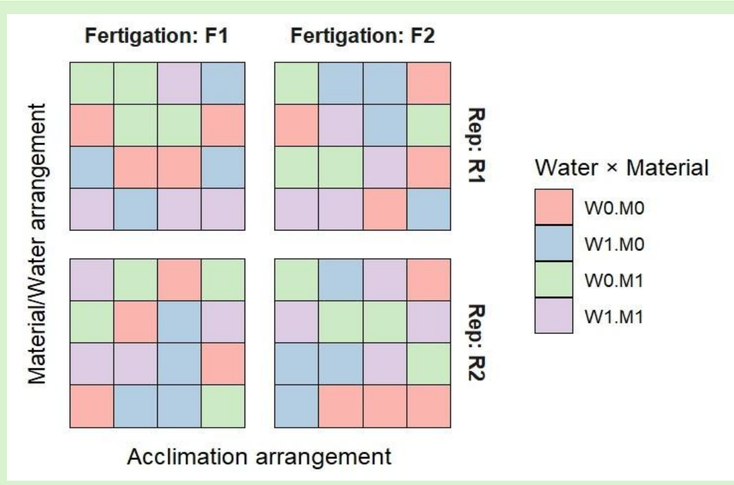


Figure 4. Split-Split plot design, n=640 plants

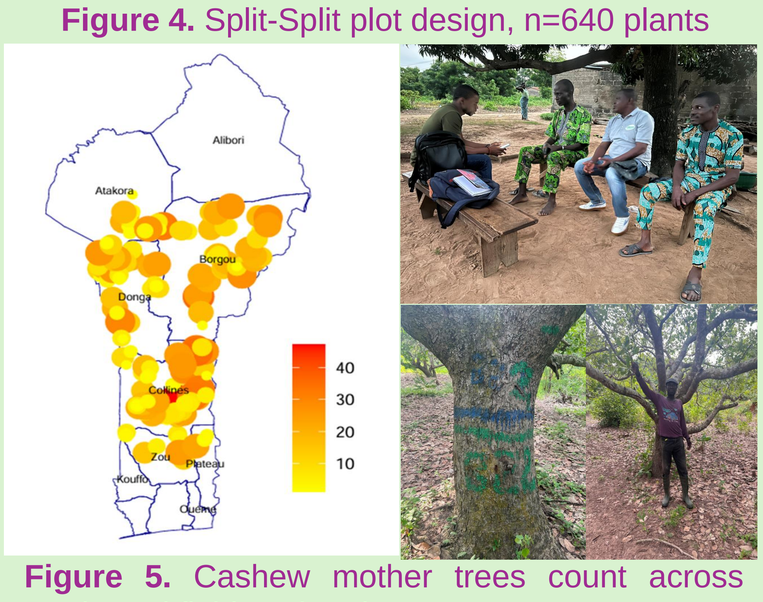


Figure 5. Cashew mother trees count across Benin and field exploration

Expected Results

- Superior cashew trees regarding nut yield and nut yield components are identified
- SNPs markers correlated with agromorphological and physiological traits are identified
- Core collection of cashew genotypes is developed and established for conservation
- Cashew seedling mortality rate is reduced by 50%
- End-users' preferred breeding traits for cashew in Benin are identified

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