SECTION 1: COUNTRY OVERVIEW & GEOGRAPHIC PROFILE

1.1 Basic Country Information

Country Name	Republic of Indonesia
Capital City	Jakarta (administrative functions relocating to Nusantara, East Kalimantan, from 2024)
BRICS Status	Partner Country – Accepted as BRICS partner at Kazan Summit (October 2024). Full member from January 2025.
Total Population	~281.6 million (2024, BPS mid-year projection) – world's 4th most populous country
Population Growth Rate	~0.85–0.9% per year (BPS); declining fertility rate
Rural Population (%)	~44–45% (BPS 2024); declining due to rapid urbanisation
Urban Population (%)	~55–56% (2024, BPS)
GDP (Nominal)	Rp 22,139.0 trillion / ~USD 1.4 trillion (2024, BPS); +5.03% real growth; world's 16th–17th largest economy
GDP per Capita	~USD 4,960 (2024, BPS); Rp 78.6 million
Agriculture's Share of GDP	~12.6% (2024, BPS – agriculture, forestry and fisheries); plantations alone contribute ~3.76% of GDP
Agriculture's Share of Employment	~29–30% of workforce (~38–40 million workers, BPS); single largest employer sector
HDI Rank	0.713 (2023/24, UNDP) – High Human Development; ~114th globally
Official Language(s)	Bahasa Indonesia (official); 700+ regional languages (Javanese, Sundanese, Madurese, etc.)
Currency	Indonesian Rupiah (IDR); avg ~15,800–16,000 IDR/USD in 2024

1.2 Geographic Coordinates & Physical Extent

Total Geographic Area	~1,904,569 km² (land); total incl. waters ~5.1 million km² – world's largest archipelago nation
Number of Islands	~17,508 islands (BPS); ~6,000 inhabited; 5 major: Java, Sumatra, Kalimantan, Sulawesi, Papua
Northernmost Point	5°54′ N (Miangas Island, North Sulawesi)
Southernmost Point	11°00′ S (Rote Island, East Nusa Tenggara)
Easternmost Point	141°01′ E (Papua border with PNG)
Westernmost Point	95°00′ E (Sabang, Aceh)
Coastline	~108,000 km (world's 2nd longest; after Canada)
Land Borders	~2,958 km (borders 3 countries: Malaysia on Borneo, Papua New Guinea on New Guinea, Timor-Leste on Timor)
Highest Point	Puncak Jaya (Carstensz Pyramid), 4,884 m (Papua) – highest peak between Himalayas and Andes

Major Rivers	Kapuas (1,143 km, Kalimantan), Mahakam, Barito (Kalimantan); Musi, Batang Hari (Sumatra); Solo, Brantas (Java)

1.3 Administrative Divisions

Primary Level	38 provinces (provinsi) – increased from 34 with creation of 4 new provinces in Papua region (2022)
Secondary Level	514 regencies (kabupaten) and cities (kota)
Tertiary Level	~7,266 districts (kecamatan) and ~83,000+ villages (desa/kelurahan)
Key Agricultural Provinces	Java (rice, vegetables, poultry – ~60% of population on ~7% of land); Sumatra (palm oil, rubber, coffee); Kalimantan (palm oil, timber); Sulawesi (cocoa, coconut, spices); Papua (sago, forestry); NTT/NTB (livestock, dryland crops)

SECTION 2: AGRO-CLIMATIC ZONES & CLASSIFICATION

2.1 National Classification

System	BMKG (Meteorology, Climatology and Geophysics Agency) / Ministry of Agriculture agro-climatic classification based on Oldeman system (wet months vs dry months)
Total Zones	5 major agro-climatic zones (Oldeman A–E) based on wet/dry month ratios
Basis	Equatorial/tropical; rainfall distribution (wet months >200 mm; dry months <100 mm); altitude; soil type

2.2 Zone-wise Description

Zone	Region	Climate	Crops	Challenges
A (Perhumid)	W. Sumatra, W. Kalimantan, Papua	No dry season; >9 wet months; 2,500–4,000 mm	Oil palm, rubber, sago, rice (1-2 crop), tropical fruits	Waterlogging; poor drainage; peat soil management
B (Humid)	E. Sumatra, C. Kalimantan, parts of Java	1–2 dry months; 2,000–3,000 mm	Oil palm, rice (2 crops), rubber, coconut, cocoa	Pest/disease pressure; occasional drought
C (Sub-humid)	Most of Java, S. Sulawesi, Bali	3–5 dry months; 1,500–2,500 mm	Rice (2–3 crops/year), maize, soybean, sugarcane, vegetables	El Niño drought risk; land conversion (urbanisation)
D (Semi-arid)	E. Java, NTT, E. NTB, parts of Sulawesi	5–7 dry months; 1,000–1,500 mm	Maize, cassava, mung bean, dryland rice, livestock	Drought; water scarcity; poor soils; poverty
E (Arid)	Parts of NTT (Timor, Sumba), Maluku	7–9 dry months; <1,000 mm	Livestock grazing; dryland crops; limited agriculture	Severe drought; erosion; food insecurity

SECTION 3: CLIMATE, RAINFALL & TEMPERATURE EFFECTS ON AGRICULTURE

3.1 Overall Climate

Köppen Classification	Tropical: Af (Equatorial rainforest – most of Sumatra, Kalimantan, Papua); Am (Tropical monsoon – Java, Sulawesi); Aw (Tropical savanna – NTT, eastern islands)
National Avg Rainfall	~2,000–3,000 mm/year (varies: >4,000 mm in W. Sumatra/Papua highlands; <1,000 mm in NTT)
Temperature	Avg 26–28°C at sea level; 18–22°C in highlands (1,000–2,000 m); year-round warm; no frost except >3,000 m
Monsoon	NW Monsoon (Oct–Mar, wet season); SE Monsoon (Apr–Sep, dry season in most areas); ITCZ migration drives rainfall

3.2 Rainfall & Temperature

Highest Rainfall	Batu Hijau (W. Sumatra): >6,000 mm; W. Kalimantan/Papua highlands: 4,000–5,000 mm
Lowest Rainfall	E. Nusa Tenggara (NTT): <700 mm in places; Palu Valley (Sulawesi): ~550 mm
El Niño Impact	Strong El Niño years (2015/16, 2023/24) cause severe drought: rice production declines 5–15%; forest fires increase dramatically; palm oil FFB yields drop
La Niña Impact	Excessive rainfall: flooding in Java/Kalimantan; waterlogging of rice fields; but generally better for production

3.3 Climate-Resilient Agriculture and Climate Action

Initiative	Institution	Description	Impact
Food Estate Programme	Ministry of Agriculture / BAPPENAS	Large-scale food production centres in Central Kalimantan, N. Sumatra, Papua; rice, cassava, maize	Target: enhance food self-sufficiency; controversial due to peatland/forest conversion concerns
20,000 Water Pumps	President Jokowi (2024)	Nationwide deployment of water pumps to shield crops from extreme weather	Targeting drought-vulnerable rice areas across Java, NTT, Sulawesi
Peatland Restoration	BRGM (Peat & Mangrove Restoration Agency)	Restoring 1.2 million ha of degraded peatland to prevent fires and carbon emissions	Fire incidents reduced from 2015 peak; peatland rewetting ongoing
B40 Biodiesel Mandate	Ministry of Energy	40% palm oil blend in diesel fuel (B40) from 2025; world's highest biodiesel mandate	Domestic CPO consumption: ~13.6 MT for biodiesel (2025 projection, GAPKI)
Climate-Resilient Rice	IRRI / Ministry of Agriculture / IAARD	Drought/flood-tolerant rice varieties; submergence-tolerant (Sub1); salt-tolerant varieties for coastal areas	Inpari, Inpago, Ciherang varieties widely adopted
Mangrove Rehabilitation	BRGM	Target: restore 600,000 ha of mangroves by 2024; blue carbon sinks; coastal protection	Indonesia has world's largest mangrove area (~3.4 million ha)

SECTION 4: CROPPING PATTERNS & AGRICULTURAL CALENDAR

4.1 Seasonal Cropping System

Season	Months	Regions	Major Crops
Wet Season (Musim Hujan)	Oct/Nov–Mar/Apr	Java, Sulawesi, NTT/NTB, E. Indonesia	Rice (main crop/MT I); planting coincides with monsoon rains
Dry Season (Musim Kemarau)	Apr/May–Sep/Oct	Java (irrigated areas); parts of Sumatra	Rice (2nd crop/MT II where irrigated); maize, soybean, secondary crops (palawija)
3rd Crop (MT III)	Jul–Oct (irrigated)	Java (W. Java, C. Java – limited)	Rice or palawija on well-irrigated land only
Perennial/Year-Round	Year-round	Sumatra, Kalimantan, Papua	Oil palm (harvest every 10–15 days); rubber (daily tapping); coffee, cocoa, tea, coconut

4.2 Major Food Crops

Rice (Paddy)	~53–54 MT paddy (GKG, 2024 BPS est.); milled rice: ~30.34 MT (BPS 2024, -2.43% vs 2023). Harvested area ~10.2–11.0M ha (USDA-FAS). World's 3rd largest rice producer. Key provinces: West Java, East Java, Central Java, South Sulawesi.
Maize (Corn)	~20–24 MT/year (BPS/USDA-FAS); ~5–6M ha. Mainly for animal feed (~60%). Key: East Java, Central Java, Lampung, NTT, Gorontalo.
Soybean	~0.6–0.8 MT/year (BPS) – production declining; imports ~2.5–3.0 MT for tempeh/tofu industry. Self-sufficiency <25%.
Cassava	~18–20 MT/year (BPS/FAO) – world's 5th–6th largest producer. Lampung (#1), Central Java, East Java. For food, starch, bioethanol.
Sweet Potato	~2.0–2.5 MT/year (BPS/FAO). Papua is major producing region (food staple for indigenous communities).

4.3 Cash Crops & Industrial Crops

Palm Oil (CPO+PKO)	~53 MT (2024, GAPKI) – world's top producer (~57% of global production). CPO: 48.16 MT; PKO: 4.60 MT. Oil palm area: ~16–17 million ha. Key: Riau, C. Kalimantan, W. Kalimantan, N. Sumatra, E. Kalimantan.
Rubber	~2.8–3.0 MT/year (BPS) – world's #2 producer (after Thailand). S. Sumatra, Riau, W. Kalimantan. Smallholders: ~85%.
Coffee	~0.77–0.80 MT/year (BPS/ICO) – world's 4th largest producer. Robusta ~75% (S. Sumatra, Lampung); Arabica ~25% (Aceh Gayo, Toraja, Flores, N. Sumatra).
Cocoa	~0.65–0.75 MT/year (BPS) – world's 3rd largest producer. Sulawesi produces ~65% (S. Sulawesi, C. Sulawesi, SE Sulawesi).
Coconut	~16–18 MT/year copra equivalent (FAO) – world's largest coconut producer. N. Sulawesi, Riau Islands, E. Java, Maluku.
Sugarcane	~2.3–2.5 MT sugar/year (Ministry of Industry) – self-sufficiency ~55–60%; imports ~3–4 MT raw sugar. E. Java, Lampung.
Tea	~0.13–0.15 MT/year (BPS) – W. Java (Puncak/Bandung), C. Java. Declining.

Spices	Cloves, nutmeg, pepper, cinnamon, vanilla – Indonesia is 'Spice Islands' origin; world's largest clove and nutmeg producer.
Tobacco	~0.15–0.20 MT/year (BPS) – E. Java, C. Java, NTB. Kretek (clove cigarette) industry.

4.4 Cropping Intensity & Productivity

Total Rice Sown Area	~10.2–11.0M ha harvested (USDA-FAS 2024/25); paddy field area (sawah): ~7.46M ha (Ministry of Agrarian Affairs 2019, declining)
Rice Yield	~4.7–4.8 t/ha milled rice equivalent (USDA-FAS 2024/25); ~5.1–5.3 t/ha paddy (BPS); stagnant for past decade
Cropping Intensity	Java: 150–200% (double/triple rice); outer islands: 100–130% (single rice + perennials)
Key Constraint	Rice paddy area declining ~40,000–80,000 ha/year due to urban/industrial conversion, especially in Java

4.5 Major Crop Varieties and Yield/ha

Crop	Varieties	Avg Yield (t/ha)	Notes
Rice (Irrigated)	Ciherang (most popular ~30%), Inpari 32 HDB, Inpari 42 (drought-tolerant), IR64, Mekongga	5.1–5.3 (paddy)	10–11M ha; hybrids <5% adoption (vs China >50%); IRRI collaboration
Maize	Pioneer P21, NK7328, BISI 18, Pertiwi (domestic)	5.0–5.5	~5–6M ha; yield improving with hybrid adoption; mainly rainfed
Oil Palm	DxP (Dura x Pisifera) hybrids; Tenera; IOPRI/PPKS varieties	3.5–4.0 (CPO/ha)	~16–17M ha; smallholders: ~2.5–3.0 t/ha vs estates: 4.0–5.0 t/ha
Coffee (Robusta)	BP 308, BP 42, SA 237 (Indonesian Coffee and Cocoa Research Institute)	0.7–0.9 (green bean)	S. Sumatra, Lampung, Bengkulu; low productivity vs Vietnam
Cocoa	Sulawesi 1, Sulawesi 2, MCC 01-02 (ICCRI)	0.5–0.8 (dry bean)	Quality declining; ageing trees; vascular streak dieback disease
Rubber	BPM 24, PB 260, RRIM 600	1.0–1.5 (dry rubber)	Smallholder yields low (~0.8–1.0 t/ha) vs estates (~1.5–2.0 t/ha)

SECTION 5: AGRICULTURAL LAND USE & LAND RESOURCES

5.1 Land Use Classification

Total Land Area	~190.5 million ha (BPS)
Agricultural Land	~57–63 million ha (World Bank/FAO – varies by definition; incl. plantation crops)
Arable Land (Food Crops)	~23–25 million ha (FAO)
Paddy Field (Sawah)	~7.46 million ha (Ministry of Agrarian Affairs 2019, declining)
Permanent Cropland/Plantations	~25–30 million ha (oil palm ~16–17M ha; rubber ~3.6M ha; coconut ~3.5M ha; coffee ~1.3M ha; cocoa ~1.5M ha)
Forest Area	~92–96 million ha (~50% of total; 2nd largest tropical forest after Brazil); deforestation rate declining but still significant
Peatland	~13.4 million ha (world's largest tropical peatland; Sumatra, Kalimantan, Papua)

5.2 Irrigation Infrastructure

Irrigated Area	~7.0-8.0 million ha total irrigation network (Ministry of Public Works); functional: ~4.7–5.0M ha; ~65% of sawah is irrigated
Major Systems	Jatiluhur Dam (W. Java – Indonesia's largest reservoir, irrigates 240,000 ha of rice); Brantas Basin (E. Java); Way Sekampung (Lampung); Asahan (N. Sumatra)
Irrigation Methods	Surface/gravity (~90% – canal systems from colonial Dutch era); sprinkler (<5%); drip (~2–3% – mainly estates/horticulture)
Key Constraints	~30% of irrigation infrastructure non-functional/degraded; siltation; lack of maintenance budget; Java infrastructure ageing

5.3 Land Tenure & Farm Structure

Smallholders	~26-27 million farming households (BPS Agricultural Census 2013 – most recent); ~68% farm <1 ha; avg farm size ~0.6–0.8 ha
Large Estates	~2,500+ large plantation companies (perseroan); dominate oil palm, rubber, tea, sugar. HGU (Right to Cultivate) land titles.
Customary/Adat Land	Significant in outer islands (Papua, Kalimantan, Sulawesi); Constitutional Court (2013) recognised customary forest rights
Land Conversion	Rice paddy conversion to urban/industrial: ~40,000–80,000 ha/year on Java; government's LP2B (sustainable agricultural land) policy to protect paddy

SECTION 6: MAJOR SOIL TYPES, SOIL HEALTH & NUTRIENT MANAGEMENT

6.1 Soil Classification System

System	Indonesian National Soil Classification / mapped to USDA Soil Taxonomy and WRB
Survey Authority	BBSDLP (Center for Agricultural Land Resources R&D) under Ministry of Agriculture; formerly Puslittanak

6.2 Major Soil Types

Soil Type	Region	Properties	Suitable Crops
Volcanic Andisol	Java, Sumatra (highlands), Sulawesi	Very fertile; high OM; well-drained; slightly acidic; derived from volcanic ash	Rice, vegetables, tea, coffee, horticulture – Indonesia's most productive soils
Ultisol/Oxisol (Red-Yellow Podzolic)	Sumatra, Kalimantan (lowlands)	Acidic (pH 4.0–5.0); low fertility; high Al/Fe; leached	Oil palm, rubber (with heavy fertilisation); poor for food crops without amendment
Histosol (Peat)	Sumatra (Riau, Jambi), Kalimantan, Papua	Very high OM; acidic; waterlogged; fire-prone when drained; up to 15m deep	Oil palm (controversial); sago; not suitable for food crops without drainage
Alluvial (Entisol/Inceptisol)	Coastal plains, river deltas (N. Java, E. Sumatra)	Variable fertility; flood-deposited; some saline/brackish	Rice (sawah); shrimp ponds (tambak); fisheries
Vertisol	E. Java, NTT, S. Sulawesi	Shrink-swell clay; cracking in dry season; moderate-high fertility	Rice, sugarcane, maize, soybean
Lithosol/Rendzina	Limestone areas (Gunung Kidul, NTT, Maluku)	Thin, rocky; low water-holding capacity; calcareous	Cassava, dryland crops; very limited; prone to erosion

6.3 Soil Degradation & Conservation

Peatland Degradation	~2.6 million ha of peatland degraded by drainage for oil palm/pulpwood; fire risk; CO_2 emissions. BRGM restoration programme targeting 1.2M ha.
Erosion	Severe on steep Java hillsides (volcanic); Loess-equivalent erosion on NTT islands; Kalimantan logging roads
Acidification	Widespread in Ultisol areas of Sumatra/Kalimantan; requires liming (dolomite) which is expensive for smallholders
Fertiliser Subsidy	Government subsidises urea, SP-36, NPK for smallholders (via Pupuk Indonesia SOE); ~Rp 33 trillion budget (2024); price: Rp 1,800/kg urea (reduced from 2,250 in 2024)

SECTION 7: LIVESTOCK SECTOR PROFILE

7.1 Livestock Population & Production

Poultry	~3.1–3.6 billion chickens (broiler + layer + native; BPS/MOA 2023); ~315M layers (2023 MOA). Poultry meat: ~4.8 MT (2023, industry est.). World's 6th–7th largest poultry producer.
Cattle	~16 million head (2023, BPS); beef production: ~0.55–0.60 MT/year; self-sufficiency ~70–75%; imports from Australia (live cattle), India (buffalo meat)
Buffalo	~1.1–1.3 million head (BPS); concentrated in N. Sumatra, W. Sumatra, NTT
Goats	~18–20 million (BPS); important for smallholder income and Eid al-Adha
Sheep	~16–18 million (BPS); mainly W. Java, C. Java, Banten
Pigs	~8–9 million (BPS); concentrated in Bali, NTT, N. Sulawesi, N. Sumatra (non-Muslim areas); Papua
Eggs	~5.5–6.0 MT/year (BPS/FAO); layer industry concentrated in Java
Milk	~0.9–1.1 MT/year (BPS) – self-sufficiency ~20%; imports: ~75–80% of demand from NZ, Australia, EU. Dairy belt: E. Java (Malang), W. Java (Lembang), C. Java.

7.2 Key Livestock Companies

Charoen Pokphand Indonesia (CPI)	Largest integrated poultry producer; feed mills, breeding, processing
Japfa Comfeed Indonesia	#2 poultry; feed, breeding, aquafeed
New Hope Liuhe Indonesia	Chinese-owned; poultry feed and breeding
Cargill Indonesia	Poultry feed; broiler integration
PT Great Giant Livestock	Beef cattle feedlot (Lampung); Australian feeder cattle imports

7.3 Livestock Production Summary

Sector	Key Info	Major Regions	National Production
Broiler Chicken	Largest protein source; 65% of animal protein	Java (>60%), Sumatra, Kalimantan	~4.5–4.8 MT meat/year; ~3.1–3.6B birds
Layer Chicken	Growing; eggs are affordable protein	E. Java, W. Java, C. Java	~5.5–6.0 MT eggs/year; ~315M layers
Beef Cattle	Deficit sector; live cattle imports from Australia	Java, NTT, S. Sulawesi, Bali	~0.55–0.60 MT; ~16M head
Native Chicken (Ayam Kampung)	Free-range; premium price; cultural preference	All provinces	~0.3–0.4 MT; ~300M+ birds
Goats/Sheep	Smallholder income; Eid demand spike	Java, NTT, NTB	~18–20M goats; 16–18M sheep
Dairy	Major deficit; import-dependent	E. Java, W. Java, C. Java	~0.9–1.1 MT milk; ~20% self-sufficient

SECTION 8: FISHERIES & AQUACULTURE SECTOR

8.1 Resource Base

Maritime Area	~5.8 million km² of maritime jurisdiction (EEZ); world's 2nd largest marine fisheries producer (after China)
Coastline	~108,000 km (world's 2nd longest)
Inland Waters	Lakes (Toba, Maninjau, Singkarak), rivers, reservoirs, aquaculture ponds

8.2 Production Statistics

Total Fisheries Production	~22–24 million t/year (KKP/FAO); marine capture: ~6.5–7.07 MT; inland capture: ~0.5–0.6 MT; aquaculture: ~15–16 MT
Marine Capture	~6.5–7.0 MT/year (KKP/FAO) – world's 2nd largest; tuna, shrimp, skipjack, mackerel, sardine
Aquaculture	~15–16 MT/year (KKP/FAO); world's 2nd–3rd largest aquaculture producer. Shrimp (~1.0–1.2 MT – vannamei/tiger); tilapia; milkfish (bandeng); seaweed (~10–12 MT wet weight); catfish (lele); carp
Seaweed	World's largest seaweed producer: ~10–12 MT wet weight (Kappaphycus/Eucheuma); NTT, Sulawesi, Maluku
Tuna	World's largest tuna producing nation; ~1.0–1.2 MT (skipjack, yellowfin, bigeye); Maluku, Papua, N. Sulawesi
Shrimp	~1.0–1.2 MT (vannamei dominant); Lampung, E. Java, S. Sulawesi; major export to US, Japan, EU
Per Capita Consumption	~55–58 kg/year (KKP target); government's 'Eat Fish' (Gemar Makan Ikan) campaign
Key Institution	KKP – Ministry of Marine Affairs and Fisheries; FAO regional hub

SECTION 9: GOOD AGRICULTURAL PRACTICES & SUSTAINABLE FARMING

9.1 GAP Certification & Standards

National Standards	IndoGAP (Indonesian Good Agricultural Practice) for food crops and horticulture; ISPO (Indonesian Sustainable Palm Oil) mandatory certification for all palm oil producers; SNI (Indonesian National Standard) for food safety
International	RSPO (Roundtable on Sustainable Palm Oil) – Indonesia has largest certified area globally; GlobalG.A.P. for export horticulture; Rainforest Alliance for coffee/cocoa; UTZ; ISO 22000
ISPO	Mandatory since 2020 (Presidential Regulation 44/2020); all palm oil growers/mills must be ISPO certified; covers environmental, social, labour standards
Organic	Growing but small: ~0.1–0.2M ha; organic rice (Bali, Java); organic coffee (Aceh, Flores); organic certification by BSN/LSPO

9.2 Integrated Pest Management

National System	BPTP (Assessment Institute for Agricultural Technology) in each province; National IPM Programme (since 1989 with FAO support); Farmer Field Schools (FFS) – Indonesia pioneered FFS model globally
Key Programmes	Brown planthopper management in rice; Fall Armyworm (since 2019); cocoa pod borer (CPB) programme in Sulawesi; coffee borer beetle (Hypothenemus hampei)
Pesticide Regulation	Ministry of Agriculture Pesticide Committee; registration required; banned several organophosphates; subsidised bio-pesticides; Farmer Field Schools promote biological control

9.3 Post-Harvest Management

Rice Storage	BULOG (national logistics agency) manages rice reserves; capacity ~2.0–3.0 MT; government purchasing price (HPP) system; village-level drying/milling infrastructure improving but still causes ~5–8% post-harvest losses
Cold Chain	Underdeveloped especially for horticulture and fisheries; ~15–20% post-harvest loss for fruits/vegetables; cold storage concentrated in Java; government investing in cold chain for outer islands
Processing	CPO refining: Indonesia has world's largest palm oil refining capacity (~45–50 MT/year); coffee processing: growing specialty/single-origin; cocoa: increasing domestic grinding (target 50% of production)

9.4 Farm Mechanisation

Mechanisation Rate	~70–75% for rice (land preparation/harvesting) in Java; 30%-40% in outer islands; very low for plantation crops (oil palm harvesting still manual)
Tractor Fleet	~300,000–500,000 two-wheel tractors (hand tractors/power tillers) – dominant due to small farm size; ~50,000–80,000 four-wheel tractors; combine harvesters limited (~5,000–10,000)

Rice Mechanisation	Hand tractors (Kubota, Yanmar, Chinese brands) for land prep; mechanised rice transplanters very low adoption (<5%); combine harvesters growing in Java
Oil Palm	Almost entirely manual (harvesting with chisel/sickle); mechanisation constrained by terrain, tree height, and smallholder farm size; drone spraying pilots
Government Programme	APBN agricultural machinery distribution: free/subsidised tractors, combine harvesters, threshers, dryers to farmer groups; ~Rp 1–2 trillion/year budget

SECTION 10: AGRICULTURAL EXPORT COMMODITIES & TRADE

10.1 Trade Profile

Agricultural Exports	~$40–45 billion/year (BPS/Ministry of Trade); dominated by palm oil products (~60–65% of agri exports)
Agricultural Imports	~$15–20 billion/year; wheat (~10–11 MT, world's 2nd largest importer), soybean (~2.5–3.0 MT), sugar (~3–4 MT raw), rice (~2–3 MT in deficit years), dairy, garlic, beef
Trade Balance	Net agricultural exporter due to palm oil; but net food importer (wheat, soybean, sugar, garlic, dairy, rice)
Palm Oil Export Value (2024)	~USD 27.76 billion (GAPKI) – down 8.44% from 2023's $30.32B due to lower volumes and price competition

10.2 Top Agricultural Export Products

Rank	Commodity	Description	Key Destinations
1	Palm Oil (CPO + derivatives)	World's #1 exporter; ~29.5 MT exported (2024, GAPKI); includes RBD olein, biodiesel, oleochemicals	India, China, EU, Pakistan, Bangladesh, Africa
2	Rubber (Natural)	World's #2 exporter; ~2.5–2.8 MT/year; SIR-20 standard	China, US, Japan, EU
3	Coffee	World's #4 exporter; robusta + specialty arabica (Gayo, Toraja, Flores, Luwak)	US, EU, Japan, Egypt, Malaysia
4	Cocoa (Beans + Processed)	World's #3 exporter; increasing domestic grinding; cocoa butter/powder growing	EU, US, Malaysia, China
5	Fishery Products	Shrimp, tuna, squid, seaweed, crab; value: ~$5–6B/year	US, Japan, EU, China, ASEAN
6	Spices	Cloves (#1 global), nutmeg (#1), pepper, cinnamon, vanilla	India, US, EU, China, Vietnam
7	Coconut Products	Copra, coconut oil, desiccated coconut, activated carbon, coconut water	US, EU, China, India
8	Wood/Forest Products	Plywood, pulp and paper (from plantation forests); FLEGT-licensed	China, Japan, South Korea, EU

10.3 Export Challenges & Opportunities

Challenges	EU Deforestation Regulation (EUDR) threatens palm oil market access; US/EU anti-dumping duties on some products; SPS barriers for fisheries; nickel export ban analogy creating trade tensions; infrastructure gaps in outer islands
Opportunities	B40 biodiesel mandate absorbs more CPO domestically; downstream processing (oleochemicals, specialty fats); specialty coffee market booming; RCEP and Indonesia-EU CEPA negotiations; growing Middle East/Africa markets; seaweed/carrageenan global demand

SECTION 11: COMMERCIAL & EMERGING TECHNOLOGIES

11.1 Digital & Precision Agriculture

AgriTech Startups	Growing ecosystem: TaniHub (marketplace), HARA (data exchange), eFishery (IoT aquaculture), Crowde (P2P lending for farmers), 8villages (extension app), Jala Tech (shrimp monitoring)
eFishery	Indonesia's largest agritech unicorn; smart feeder for shrimp/fish ponds using IoT + AI; >200,000 farmers; raised $200M+
Government Digital	SIMLUHTAN (agricultural extension information system); SiPetani (farmer registration database); drone mapping for palm oil

11.2 Biotechnology & Crop Improvement

GM Crop Status	Only GM crop approved for cultivation: Bt sugarcane (NXI-4T, approved 2023 by Ministry of Environment and Forestry). GM soybean/corn imported for feed/processing but not planted. Indonesia is cautious on GM food crops.
Hybrid Rice	Low adoption (<5% of rice area) vs China (>50%); government programmes to expand but farmer resistance due to seed cost and inability to save seed
Research Institutions	IAARD (Indonesian Agency for Agricultural R&D); IRRI-Indonesia; ICCRI (coffee/cocoa); IOPRI/PPKS (palm oil); Bogor Agricultural University (IPB)

11.3 Protected Cultivation & Controlled Environment

Greenhouse Area	Limited: ~5,000–10,000 ha (mainly Java/Bali highlands); much smaller than China or India; mainly for horticulture (tomatoes, capsicum, strawberries, flowers)
Key Regions	Lembang (W. Java), Batu (E. Java), Bedugul (Bali), Berastagi (N. Sumatra)
Technology	Simple plastic tunnels/shade houses dominant; few Venlo-type glasshouses; hydroponic/vertical farming startups in Jakarta, Bandung, Surabaya

11.4 Indonesia-India Agricultural Technology Exchange

Innovation	Sector	Indonesia Strength	India Application	Impact
Palm Oil Sustainability	Plantation Crops	World's #1 producer; ISPO/RSPO certification; downstream processing	India's oil palm expansion in NE states (Mizoram, Arunachal)	Sustainable palm oil models; ISPO adaptation for Indian conditions
Aquaculture IoT (eFishery)	Fisheries	Smart feeder tech; shrimp/fish pond IoT monitoring; data analytics	India's shrimp belt (AP, Tamil Nadu, Gujarat)	Precision feeding; disease early warning; yield optimisation
Smallholder Rubber	Plantation Crops	85% smallholder rubber; cooperative models; SIR standards	India's Kerala/NE rubber (world's #5 producer)	Processing quality improvement; productivity programmes
Specialty Coffee	High-Value Crops	Gayo Arabica, Toraja, Flores – world-class single-origin; wet-hull (Giling Basah) processing	India's Coorg, Chikmagalur, NE India (Arabica potential)	Processing techniques; origin branding; direct trade models

Innovation	Sector	Indonesia Strength	India Application	Impact
Seaweed Farming	Aquaculture	World's #1 seaweed producer (~10–12 MT); carrageenan export	India's Tamil Nadu, Gujarat coastal communities	Farming techniques; value chain for carrageenan; livelihoods
Farmer Field Schools	Extension	Indonesia pioneered FFS model (IPM-FFS since 1989); exported to 90+ countries	India's KVK system + ATMA	Participatory learning; farmer-to-farmer extension; IPM adoption

SECTION 12: FOOD SECURITY & NUTRITION

12.1 Production Overview

Rice (Milled, 2024)	~30.34 MT (BPS 2024 estimate, -2.43% vs 2023); demand: ~31–32 MT – deficit covered by imports (~2–3 MT in 2024)
Palm Oil (CPO+PKO, 2024)	52.76 MT (GAPKI) – world's #1; domestic consumption: 23.8 MT; exports: 29.5 MT
Poultry Meat (2023)	~4.8 MT (industry est.); per capita consumption: ~12.6–13.2 kg/year (growing)
Fisheries (Total)	~22–24 MT/year; per capita fish consumption: ~55–58 kg/year (KKP target)
Eggs	~5.5–6.0 MT/year; affordable protein source
Food Self-Sufficiency Target	President Prabowo's vision: rice self-sufficiency by 2025 (targeting 32 MT production); food estate programme; stop rice imports

12.2 Food Security & Nutrition

Global Hunger Index	Score: 17.8 (2024, GHI) – Moderate; ranking ~77th/127 countries; improved from 28.6 in 2000
Stunting	~21.6% of children under 5 (2022, Riskesdas/BPS) – declining but still a major concern; target: 14% by 2024 (National Development Plan)
Undernourishment	~6–8% of population (FAO SOFI 2024 est.); food access issues in remote eastern Indonesia (Papua, NTT, Maluku)
Import Dependencies	Wheat: ~10–11 MT (100% imported – world's 2nd largest importer); soybean: ~2.5–3.0 MT (~75% imported); sugar: ~3–4 MT (40–45% imported); garlic: ~85% imported (from China)
Food Price Volatility	Rice prices spiked 2023–24 due to El Niño-driven production shortfall; government deployed BULOG reserves + imports to stabilise
Social Protection	Programme Keluarga Harapan (PKH) – conditional cash transfer; Bantuan Pangan (CPP) – subsidised rice for 16M recipients (2025); BULOG rice distribution

SECTION 13: KNOWLEDGE EXCHANGE – BEST PRACTICES

13.1 What Indonesia Can Offer BRICS Nations

#	Achievement	Description
1	World's #1 Palm Oil Producer	52.76 MT CPO+PKO (2024); 57% of global production; complete value chain from plantation to oleochemicals/biodiesel
2	World's #1 Seaweed Producer	~10–12 MT wet weight; carrageenan for food/pharma; livelihood model for coastal communities
3	World's Largest Tuna Producer	~1.0–1.2 MT; sustainable fishing practices; pole-and-line methods
4	Farmer Field School Model	Pioneered IPM-FFS (1989); exported to 90+ countries through FAO; participatory farmer extension
5	Spice Islands Heritage	World's #1 clove and nutmeg producer; centuries of spice trade; origin branding potential
6	B40 Biodiesel (World's Highest Blend)	40% palm oil blend in diesel from 2025; energy security + CPO domestic absorption + CO_2 reduction
7	Tropical Aquaculture Expertise	Shrimp (vannamei), milkfish, tilapia, catfish farming; eFishery IoT innovation
8	Specialty Coffee	4th largest producer; Gayo, Toraja, Flores, Java – world-renowned single origins; wet-hull processing

13.2 What Indonesia Can Learn from BRICS

#	Area	From	Opportunity
1	Rice Productivity	China, India	China's hybrid rice (>7 t/ha vs Indonesia's 4.7); India's SRI method; Indonesia's rice yield stagnant for 10+ years
2	Mechanisation at Scale	China, India, Brazil	Brazil's large-scale grain mechanisation; China's agricultural drones; India's tractor manufacturing
3	Soybean/Oilseed Production	Brazil, India	Brazil produces 150+ MT soybean (vs Indonesia <1 MT); India's oilseed diversification; reduce import dependency
4	Dairy Development	India	India's Operation Flood/AMUL model; Indonesia's dairy self-sufficiency only ~20%
5	Beef Cattle Genetics	Brazil, South Africa	Brazil's Nelore adaptation to tropics; feedlot efficiency; embryo transfer technology
6	Irrigation Modernisation	China, India	China's drip irrigation (esp. Xinjiang cotton); India's PMKSY micro-irrigation; 30% of Indonesia's canals non-functional
7	Sugar Industry	Brazil, India	Brazil is world's #1 sugar producer; India #2; Indonesia imports ~40% of sugar; efficiency improvement needed
8	Digital Extension	India, China	India's 731 KVKs; China's rural e-commerce (Taobao Villages); complement Indonesia's FFS model

13.3 Agro-Climatic Matching – Indonesia-India

Indonesia Region	India State	Climate	Crops	Tech Transfer
Java (Irrigated Lowlands)	Tamil Nadu / AP / WB	Tropical; irrigated paddy	Rice, vegetables, poultry, aquaculture	Hybrid rice varieties; SRI method; aquaculture intensification

Indonesia Region	India State	Climate	Crops	Tech Transfer
Sumatra (Plantation Belt)	Kerala / NE India	Tropical perhumid	Oil palm, rubber, coffee	Rubber productivity; spice processing; palm oil sustainability
Sulawesi (Cocoa/Spice)	Karnataka / Kerala	Tropical monsoon	Cocoa, coconut, cloves, nutmeg	Cocoa processing; coconut value addition; spice quality
NTT/NTB (Dryland)	Rajasthan / AP (dryland)	Semi-arid tropical	Maize, cassava, livestock, dryland crops	Dryland farming; goat/sheep genetics; watershed management
Papua (Frontier)	NE India (Mizoram, Nagaland)	Tropical highland/forest	Sago, sweet potato, coffee, cacao	Highland agriculture; indigenous crop conservation; coffee development
Coastal Indonesia	Gujarat / Odisha / AP coast	Tropical coastal	Shrimp, milkfish, seaweed, mangroves	Shrimp farming tech; mangrove restoration; coastal resilience

SECTION 14: REFERENCES & DATA SOURCES

14.1 Primary Data Sources

BPS	Badan Pusat Statistik (Statistics Indonesia) – population, GDP, rice production, agricultural indicators. bps.go.id
Ministry of Agriculture	Kementerian Pertanian – crop estimates, livestock statistics, extension, food security. pertanian.go.id
GAPKI	Gabungan Pengusaha Kelapa Sawit Indonesia (Indonesian Palm Oil Association) – CPO production, exports, consumption. gapki.id
KKP	Kementerian Kelautan dan Perikanan (Ministry of Marine Affairs and Fisheries) – fisheries statistics. kkp.go.id
USDA-FAS Jakarta	Grain & Feed Annual, Oilseeds Annual, Livestock, Sugar reports. fas.usda.gov
FAOSTAT	Production, trade, land use statistics. faostat.fao.org
World Bank	GDP, population, arable land, poverty data. data.worldbank.org
IMF WEO	GDP, per capita (October 2025). imf.org/weo
BMKG	Badan Meteorologi, Klimatologi dan Geofisika – climate, weather, agro-meteorology. bmkg.go.id
UNDP HDR	Human Development Index. hdr.undp.org
IOPRI/PPKS	Indonesian Oil Palm Research Institute – oil palm R&D. iopri.org
ICCRI	Indonesian Coffee and Cocoa Research Institute – coffee/cocoa varieties, processing. iccri.net
BRGM	Badan Restorasi Gambut dan Mangrove – peatland and mangrove restoration agency

14.2 Glossary

Term	Definition
BPS	Badan Pusat Statistik – Statistics Indonesia (central statistics agency)
BULOG	Badan Urusan Logistik – National Food Logistics Agency; manages rice reserves and imports
CPO	Crude Palm Oil – primary product of oil palm processing
GAPKI	Indonesian Palm Oil Association
GKG	Gabah Kering Giling – Milled Dry Unhusked Rice (paddy equivalent measure used by BPS)
HPP	Harga Pembelian Pemerintah – Government Purchasing Price for rice/paddy
ISPO	Indonesian Sustainable Palm Oil – mandatory national certification
IAARD	Indonesian Agency for Agricultural Research and Development
KKP	Ministry of Marine Affairs and Fisheries
Sawah	Irrigated wet rice paddy field
Palawija	Secondary food crops grown after rice: maize, soybean, peanuts, mung bean, cassava