SECTION 1: COUNTRY OVERVIEW & GEOGRAPHIC PROFILE

1.1 Basic Country Information

Country Name	Republic of South Africa
Capital Cities	Pretoria (Executive), Cape Town (Legislative), Bloemfontein (Judicial)
BRICS Status	Founding Member – Joined 2010 (3rd BRICS Summit, Sanya)
Total Population	~63 million (mid-2024, Stats SA P0302) – 51.0% female (32.13M), 49.0% male (30.89M)
Population Growth Rate	~1.33% per annum (mid-2023 to mid-2024, Stats SA)
Rural Population (%)	~33% (2024, World Bank)
Urban Population (%)	~67% (2024, World Bank) – Gauteng 25.3%; KwaZulu-Natal 19.6%
GDP (Nominal)	~R7.3 trillion (2024, Stats SA GDP Q4); USD ~373 billion (2024, IMF/WB)
GDP per Capita	~USD 6,365 (2024, IMF)
Agriculture's Share of GDP	~2.8% (2024, DALRRD Economic Review); +17.2% in Q4 2024 (Stats SA). Net farm income: R130,712M (2024)
Agriculture's Share of Employment	~5.2% formal (~840,000–900,000); up to ~8–10% incl. informal/subsistence (QLFS/Stats SA)
HDI Rank	Score: 0.717 (2023/24, UNDP) – Medium Human Development; ~110th–115th globally
Official Language(s)	12 official languages: Zulu, Xhosa, Afrikaans, English, Sepedi, Setswana, Sesotho, Tshivenda, Xitsonga, siSwati, isiNdebele, SA Sign Language
Currency	South African Rand (ZAR); floating; ~ZAR 18.2/USD (early 2025)

1.2 Geographic Coordinates & Physical Extent

Total Geographic Area	1,219,090 km² – 25th globally; largest economy in Africa
Northernmost Latitude	22°08′ S (Limpopo River)
Southernmost Latitude	34°50′ S (Cape Agulhas)
Easternmost Longitude	32°54′ E (KZN)
Westernmost Longitude	16°28′ E (N. Cape, Atlantic)
Total Coastline	~2,798 km (Atlantic + Indian Ocean)
Land Borders	~5,244 km (Namibia 1,005; Botswana 1,969; Zimbabwe 230; Mozambique 496; Eswatini 438; Lesotho 1,106)
Bordering Countries	6 – Namibia, Botswana, Zimbabwe, Mozambique, Eswatini, Lesotho
Highest Point	Mafadi Peak, 3,450 m (Drakensberg)
Major Rivers	Orange-Vaal (~2,200 km); Limpopo; Tugela; Breede; Olifants; Great Fish

1.3 Administrative Divisions

9 Provinces, each with provincial Dept of Agriculture. Federal authority: DALRRD.

Provinces	Gauteng, KwaZulu-Natal, Western Cape, Eastern Cape, Limpopo, Mpumalanga, North West, Free State, Northern Cape
Total Municipalities	257 (8 metropolitan, 44 district, 205 local)
Key Agri Provinces	Free State (maize/wheat 'breadbasket'); W. Cape (wine/fruit/wheat); KZN (sugarcane/dairy); Mpumalanga (maize/citrus/forestry); Limpopo (subtropical fruit/vegetables)
Major Irrigation Schemes	Vaalharts (36,000 ha, N. Cape); Breede River (W. Cape); Loskop (Mpumalanga); Sundays River (E. Cape)

SECTION 2: AGRO-CLIMATIC ZONES & CLASSIFICATION

2.1 National Classification

System	DALRRD / FAO / SAWS climate regions
Total Zones	6 major (Mediterranean, Highveld, Subtropical, Semi-Arid/Karoo, Highland, Temperate Coastal)
Basis	Rainfall seasonality (winter vs summer), temperature, altitude, soil type

2.2 Zone-wise Description

Zone	Area	Rainfall	Temperature	Major Crops	Challenges
1. W. Cape Mediterranean	~130,000 km²	300–600 mm (winter)	15–20°C	Wine, wheat, canola, deciduous fruit, rooibos, fynbos flowers	Drought (2015–18 crisis); climate change
2. Highveld Plateau	~300,000 km²	500–800 mm (summer)	14–20°C; frost in winter	Maize ('Maize Triangle'), soya, sunflower, sorghum, wheat, groundnuts	El Niño drought; hail; frost
3. Subtropical Lowveld	~200,000 km²	600–1,200 mm (summer)	20–28°C; frost-free	Sugarcane (KZN), citrus, avocados, macadamias, bananas, forestry	Flooding; pests; labour issues
4. Semi-Arid / Karoo	~400,000+ km²	100–400 mm (erratic)	17–24°C; extreme range	Sheep (Karoo Lamb GI), goats (mohair), cattle; irrigated grapes/lucerne	Desertification; overgrazing; predation
5. Drakensberg Highlands	~50,000 km²	700–2,000 mm	8–18°C; snow in winter	Livestock grazing, potatoes, temperate veg, timber	Short season; frost; soil erosion
6. E. Cape Temperate Coastal	~170,000 km²	400–800 mm (bimodal)	16–22°C	Dairy, pineapples, citrus, chicory, mohair goats	Variable rainfall; land reform

SECTION 3: CLIMATE, RAINFALL & TEMPERATURE EFFECTS ON AGRICULTURE

3.1 Overall Climate

Köppen Classification	Diverse: BWk, BSk/BSh, Csa/Csb, Cfa/Cfb, Cwa/Cwb – desert to subtropical
Dominant Climate	Semi-arid to sub-humid; 65% receives <500 mm/year
Rainfall Seasonality	Summer: Oct–Mar (eastern 2/3); Winter: May–Aug (W. Cape); All-year: Garden Route
National Avg Rainfall	~464 mm/year (30th driest country)

3.2 Rainfall & Agriculture

Highest Rainfall	Eastern escarpment (Mpumalanga/KZN): 1,000–2,000 mm
Lowest Rainfall	N. Cape (Richtersveld): <100 mm
Drought-Prone	N. Cape, Free State (west), N. West, Limpopo. El Niño years severe (2015/16, 2023/24)
Flood-Prone	KZN coast (Apr 2022 catastrophic); Mpumalanga Lowveld

3.3 Climate Change Impact

Observed	Temperature +1.5°C since 1931 (SAWS); rainfall variability increasing
Projected 2050	+1.5°C to +3.0°C (IPCC AR6/SA LTAS)
Most Vulnerable	Maize belt (drought/heat); W. Cape wine (reduced chill); KZN sugarcane (shifting rain)
Adaptation Policy	NCCAS (2020); CSA Strategic Framework (DALRRD); NDC 350–420 Mt CO2eq by 2030
CSA Programs	CA on ~400,000+ ha; ARC drought-tolerant maize; precision farming; LandCare; Working for Water

3.4 Climate-Resilient Agriculture and Climate Action

Initiative / Technology	Implementing Institution	Description	Impact / Benefit
WEMA/TELA Drought-Tolerant Maize	ARC / CIMMYT / AATF	106 DroughtTEGO hybrids released; TELA GM (drought+Bt) in SA since 2016; royalty-free to smallholders	24–35% higher yield under drought (CIMMYT); +2 MT maize in drought years across SSA
Conservation Agriculture (CA)	DALRRD / Grain SA / FAO-SUCASA	Min-till, permanent cover, crop rotation via NCATF; ~400,000+ ha adopted nationally	30% input cost reduction; improved soil carbon; reduced CO2 emissions
Working for Water (WfW)	DFFE	Alien invasive plant removal since 1995; ~1.5M ha cleared	Restores 50–80M m³/year water; 20,000+ rural jobs/year
LandCare Programme	DALRRD	Community-based soil/veld management across 9 provinces (WaterCare, VeldCare, SoilCare)	Rehabilitated degraded farmland; supports emerging farmers

Initiative / Technology	Implementing Institution	Description	Impact / Benefit
GM Crop Adoption	DALRRD / Biosafety SA	Only major African GM grower: ~2.7M ha Bt maize, HT soya/cotton; GMO Act 1997	60–80% insecticide reduction; R1–2B/year yield protection; enables no-till
CASP	DALRRD	Grant funding for emerging farmers: irrigation, fencing, storage, training	>200,000 households supported
Agro-Energy Fund	Land Bank / DALRRD (2023)	Credit for solar irrigation, renewable energy, green tech on farms	Reduced grid dependence and carbon footprint
NCCAS	DFFE (2020)	National climate adaptation framework; NDC 350–420 Mt CO2eq by 2030	Policy coherence; climate risk in agri planning
SASRI Sugarcane Breeding	SASRI	Drought/heat/disease-tolerant varieties; 12–15 year cycles; crop modelling	Yields maintained under 10–15% rainfall reduction; supports ~R11B/year industry
Precision Agriculture	ARC / Aerobotics / Private	NDVI, drones, GPS, soil sensors; ~20–30% adoption on large farms	15–25% input reduction; real-time decision support

SECTION 4: CROPPING PATTERNS & AGRICULTURAL CALENDAR

4.1 Seasonal Cropping System

Season	Months	Regions	Major Crops
Summer (Primary)	Oct–Apr	Highveld, Lowveld, KZN	Maize, soya beans, sunflower, sorghum, groundnuts, sugarcane, cotton, dry beans
Winter	May–Sep	Western Cape, Free State, N. Cape	Wheat, barley, canola, oats; citrus harvest; deciduous fruit harvest (Feb–Apr)
Perennial / Year-round	Jan–Dec	All zones	Sugarcane (12–24 month cycle), fruit orchards, vineyards, forestry, livestock

4.2 Major Food Crops

Staple Cereals	Maize: ~13.31 MT (2024 CEC) from ~2.636M ha; ~16.44 MT (2024/25 – 2nd largest on record). Annual consumption ~12 MT. Wheat: ~2.0–2.1 MT from ~520,200 ha (W. Cape 71%). Sorghum: ~140,000–180,000 t.
Oilseeds	Soya beans: ~2.771 MT (2024/25 record, +50% YoY). Sunflower: ~529,000 ha, yield ~1.23 t/ha. Canola: ~141,100 ha (+7.5% YoY, W. Cape). Groundnuts: declining area.
Root & Tuber Crops	Potatoes: ~2.5–2.7 MT/year; SA's 2nd most important food crop after maize. Limpopo, Free State, Mpumalanga.
Vegetables	Production increased in 2024 (DALRRD): cauliflower, lettuce, cucumbers, potatoes, onions, pumpkins, carrots. Major areas: Limpopo, W. Cape, Mpumalanga.
Fruits – Citrus	World's 2nd largest citrus exporter. Oranges ~R14,388M exports. Grapefruit (4th globally). Soft citrus/nartjies. Limpopo, Mpumalanga, E. Cape.
Fruits – Deciduous	Apples ~R10,524M exports; Grapes ~R12,193M; Pears (7th globally); Stone fruit. Western Cape dominant.
Fruits – Subtropical	Avocados (rapidly expanding), macadamia nuts (world's largest producer), mangoes, bananas, litchis. Limpopo/Mpumalanga.
Wine Grapes	~1.9 MT grapes; wine exports ~R10,210M (2023/24). W. Cape wine regions globally renowned.

4.3 Cash Crops & Industrial Crops

Major Cash Crops	Sugarcane: ~16–19 MT/year (KZN ~85%); income +22.2% YoY (DALRRD 2024). Citrus (Orange, grapefruit, soft citrus, export-oriented). Wine grapes. Macadamia nuts. Soybean. Maize. Apples. Pears
Industrial Crops	Cotton: ~15,000–25,000 t lint/year (Limpopo, Mpumalanga – small but growing). Timber plantations: ~1.2M ha (eucalyptus, pine, wattle) for pulp, paper, construction. Wattle bark for tannin.
Fibre Crops	Wool: ~45,000–50,000 t greasy/year (SA 4th globally). Mohair: 2,000–2,500 t/year (~50% of world supply, E. Cape Angora goats). Sisal: small production.

Bioenergy Crops	Sugarcane bagasse co-generation (KZN mills). Bioethanol from grain sorghum/sugar. Biodiesel research from soya/canola. Solar increasingly replacing bioenergy.
Beverage Crops	Rooibos tea (Cederberg, W. Cape – endemic, GI protected; ~15,000–20,000 t/year). Honeybush tea. Wine (see above). Hops (George, W. Cape).
Specialty Crops	Fynbos cut flowers (Proteaceae – exported to EU). Buchu (indigenous medicinal). Essential oils (tea tree, geranium). Dried fruit (raisins, apricots – N. Cape).

4.4 Cropping Intensity & Productivity

Cropping Intensity (national avg.)	~100–110% (mostly single-crop rainfed systems; limited double-cropping due to frost/drought constraints; W. Cape irrigated areas achieve higher intensity)
Average Crop Yield – Maize	~5.05 t/ha (2024 CEC); 6.44 t/ha yellow maize; 4.08 t/ha white maize. Best farms achieve 10–14 t/ha under irrigation.
Average Crop Yield – Wheat	~3.5–4.0 t/ha (W. Cape irrigated); ~2.0–2.5 t/ha (dryland Free State)
Total Food Grain Production	~15–18 MT/year (maize + wheat + sorghum + barley); varies significantly with rainfall
Total Horticulture Production	Horticulture gross income ~R123,542M (2024 DALRRD) – citrus, vegetables, deciduous/subtropical fruit, wine
Gross Value of Field Crops	~R120-150 billion/yesr (2023/24 DALRRD) – maize 47.5%, sugarcane 13.8%, soya 12.8%, wheat 9.6%

4.5 Major Crop Varieties and Yield/ha

Crop	Important Varieties (SA)	Avg Yield (t/ha)	Notes
White Maize	DKC 73-74, PAN 5A-291, IMP 50-10 (DeKalb, Pannar, Monsanto hybrids); DroughtTEGO (ARC/WEMA)	~4.0-5.0 (2024 CEC)	~1.555M ha; ~6.34 MT; staple food (pap/mealie meal); 81 kg/capita/year
Yellow Maize	DKC 61-94, PAN 6Q-345, Pioneer hybrids; Bt and HT stacked traits	~5.5-6.5 (2024 CEC)	~1.081M ha; ~6.97 MT; primarily livestock feed; also exported
Soya Beans	PAN 1532R, DM 5953 RSF, LS 6164R (Roundup Ready)	~1.8–2.2	~2.771 MT (2024/25 record); oilseed crushing for meal and oil; SA's fastest growing field crop
Wheat	SST 015, SST 056, PAN 3120 (SENSAKO/Pannar); Elands, Duzi	~3.5–4.0 (irrigated); 2.0 (dryland)	W. Cape 71% of area; SA imports ~50% of wheat needs; winter crop
Sugarcane	N12, N31, N41, N53 (SASRI bred); NCo376 (older, declining)	~60–80 (cane/ha)	KZN; 12–24 month cycle; sugar + ethanol + co-gen; SASRI world-class breeding
Sunflower	AGSUN 8251, PAN 7057, Hysun hybrids	~1.23 (2024 CEC)	529,000 ha; cooking oil primary use; N. West, Free State

Crop	Important Varieties (SA)	Avg Yield (t/ha)	Notes
Citrus (Oranges)	Valencia, Navel, Midnight; SA CRI disease-free nursery material	~30–45 (fruit/ha)	SA 2nd largest exporter; R14.4B exports; Limpopo, Mpumalanga, E. Cape
Table Grapes	Crimson Seedless, Thompson, Sugraone, ARRA varieties	~15–25	Berg River, Hex River (W. Cape); R12.2B grape exports
Apples	Golden Delicious, Granny Smith, Fuji, Pink Lady/Cripps Pink, Rosy Glow	~40–60	Groenland, Ceres, Langkloof (W. Cape/E. Cape); R10.5B exports
Macadamia Nuts	Beaumont, HAES 816, A4, A16 (SA bred + Hawaiian varieties)	~3–5 (kernel/ha)	World's largest producer; Mpumalanga, KZN, Limpopo; rapidly expanding

SECTION 5: AGRICULTURAL LAND USE & LAND RESOURCES

5.1 Land Use Classification

Total Geographic Area	121.9 million ha (1,219,090 km²)
Total Agricultural Land	~96.3 million ha (79% – FAO/World Bank); mostly natural grazing/pasture
Arable Land (Crop Suitable)	~11-13% of total area (~12.5-13.5M ha – DALRRD/FAO)
Net Cultivated Area	~5.0–6.0M ha under commercial crops (DALRRD); maize alone ~2.6M ha
Permanent Pastures/Grazing	~82–84M ha; supports extensive livestock farming
Forestry Plantation Area	~1.2M ha commercial timber (eucalyptus, pine, wattle); Mpumalanga, KZN
Protected Areas	~15% of terrestrial area under conservation
Barren / Uncultivable Land	Limited compared to MENA countries; ~5–7% truly barren (desert/rocky/urban)

5.2 Irrigation Infrastructure

Total Irrigated Area	~1.5–1.67 million ha (~1.3% of total area; among highest in Africa)
Irrigation Water Share	Agriculture uses ~60% of SA's total water resources (DWS)
Major Irrigation Schemes	Vaalharts (36,000 ha – largest, N. Cape/N. West); Breede River (W. Cape); Orange-Riet (Free State); Loskop (Mpumalanga); Sundays River (E. Cape); Komati (Mpumalanga)
Irrigation Methods	Centre-pivot and linear move (~40% of irrigated area); flood/furrow (~30% – declining); micro/drip (~20% – growing, mainly horticulture); sprinkler (~10%)
Water Source for Agriculture	Rivers/dams (~70%); groundwater/boreholes (~25%); recycled water (~5%). SA has ~4,395 registered dams (DWS).
Water Use Efficiency Programs	DALRRD Water Use Efficiency Programme; mandatory water use licences (National Water Act 1998); irrigation scheduling advisory services; precision irrigation adoption growing
Key Constraints	Ageing infrastructure; declining water quality (acid mine drainage); over-allocation in some catchments; climate change reducing rainfall reliability; load-shedding affecting pumps

5.3 Land Tenure & Farm Structure

Commercial Farms	~35,000–40,000 units (declining from ~60,000 in 1994)
Smallholder/Subsistence	~2.5–4M households involved in agriculture (Census 2022, Stats SA); 89.2% agricultural activity in backyards
Land Reform Status	Target: 30% redistribution (missed). ~8–10% redistributed since 1994. Land Court Act 2024.
Average Commercial Farm Size	1,500–2,500 ha (variable: 5–50 ha intensive W. Cape; 5,000+ ha extensive N. Cape)

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

6.1 Soil Classification System

Classification System Used	South African Soil Classification System (1991, revised) – unique binomial system based on diagnostic horizons; also mapped to USDA Soil Taxonomy and FAO-WRB
Total Soil Forms Identified	73 soil forms in SA system; based on topsoil + subsoil diagnostic horizon combinations
Soil Survey Authority	ARC-Institute for Soil, Climate and Water (ARC-ISCW); DALRRD; university soil science departments (Pretoria, Free State, Stellenbosch, KZN)
Key Reference	The Soil Classification: A Binomial System for South Africa (Soil Classification Working Group, 1991)

6.2 Major Soil Types

Soil Type	SA Classification	Regions	Properties	Suitable Crops
Red-Yellow Apedal	Hutton/Clovelly	Highveld, Mpumalanga	Deep, well-drained, moderate fertility; pH 5.0–6.5	Maize, soya, sunflower, groundnuts
Black Vertisols	Arcadia/Rensburg	Free State, KZN interior	High clay >35%, swelling, high CEC; pH 6.0–8.0	Wheat, cotton, lucerne
Sandy Coastal	Fernwood/Vilafontes	W. Cape, KZN coast	Leached, acidic, low fertility; pH 4.5–6.0	Wine grapes, fynbos, forestry
Karoo Soils	Mispah/Glenrosa	N. Cape, Karoo	Shallow, rocky, alkaline; low OM	Extensive grazing only; irrigated lucerne
Plinthic Soils	Bainsvlei/Bloemdal	Central Highveld	Laterite layer; seasonal waterlogging	Maize (with management), pastures
Alluvial Soils	Oakleaf/Dundee	River valleys nationwide	Variable depth, fertile, well-drained	Vegetables, citrus, lucerne, dairy pastures

6.3 Soil Health Indicators

National Average Soil pH	5.0–6.5 (summer rainfall – acidic); 7.0–8.0 (Karoo – alkaline)
Organic Carbon Status	Low: 0.5–2.0% in cropped soils; 3–4% in cooler highland grasslands
Major Nutrient Deficiencies	Phosphorus (widely deficient); nitrogen (leached in sandy soils); potassium (variable); zinc and boron (localised)

6.4 Soil Degradation & Conservation

Soil Erosion	Affects ~70% of agricultural land (ARC); water erosion dominant in eastern SA; wind erosion in Free State/N. Cape. ~300–400 million tonnes soil lost/year
Soil Acidification	Widespread in Highveld from nitrogen fertilisers and acid rain; requires regular liming (~2–4 t lime/ha every 3–5 years)

Salinisation	Localised in irrigation schemes (Vaalharts, Breede River); dryland salinity emerging in W. Cape
Conservation Programmes	LandCare (DALRRD); Conservation Agriculture (~400,000+ ha no-till); ARC-ISCW soil mapping and advisory; Working for Water (alien removal restores soil/water)
Legislation	Conservation of Agricultural Resources Act (CARA, Act 43 of 1983) – regulates soil conservation, veld management, alien plant control

SECTION 7: LIVESTOCK SECTOR PROFILE

7.1 Livestock Population

Cattle	~12.8M heads (DALRRD 2020); ~80% communal/smallholder. Breeds: Bonsmara, Brahman, Nguni, Simmentaler, Angus, Hereford
Sheep	~19.4M heads (DALRRD 2020); SA 4th largest wool producer, 2nd largest mohair. Breeds: Merino, Dorper, SA Mutton Merino, Ile de France. Karoo Lamb – GI product.
Goats	~3.0M heads (DALRRD 2020); Angora (~50% world mohair supply); Boer (SA-origin, global meat breed); indigenous Nguni goats
Pigs	~1.5M heads (DALRRD 2020); intensive commercial: Large White, Landrace, Duroc. Limpopo, N. West, W. Cape.
Poultry	Broilers: ~1.0–1.1 billion slaughtered/year; Layers: ~27.6M (SAPA). Poultry meat is #1 protein (~42 kg/capita/year). Total ~38.2M at any time.
Dairy Cattle	~500,000–600,000 cows; ~1,300–1,500 producers (Milk SA). Holstein-Friesian, Jersey, Ayrshire.
Ostrich	World's largest producer: ~150,000–200,000 birds (Klein Karoo/Oudtshoorn). Meat, leather, feathers exported.
Game/Wildlife	~20M head on ~10,000+ wildlife ranches (~17% of agri land); most diversified wildlife ranching globally

7.2 Livestock Production Data

Livestock GDP Share	~41% of total agricultural gross value (DALRRD 2025/BFAP 2025)
Animal Products Income	~R193,869M (year ended Jun 2024, +6.1% YoY, DALRRD). Eggs +19.0%, milk +12.9%, poultry +10.0%
Total Meat Consumption	~4.0 MT/year (poultry, beef, lamb, pork); ~R250B consumer spending on meat
Poultry Meat Production	~1.8–2.0 MT/year; SA also imports ~500,000+ t chicken (Brazil, EU, US)
Beef Production	~1.0 MT/year; ~3.26M cattle slaughtered (2022, FAO)
Dairy Production	~3.2–3.4 billion litres/year (Milk SA/LACTO DATA); self-sufficient in liquid milk
Wool Production	45,000–50,000 t greasy/year (4th globally); ~4.81M sheep slaughtered for meat (2022, FAO)
Mohair Production	2,000–2,500 t/year (~50% world production); Eastern Cape Angora goat industry

7.3 Livestock Production Summary

Sector	Species / Breed	Major Producers / Regions	Avg Productivity	National Production
Beef Cattle	Bonsmara, Brahman, Nguni, Angus	Free State, N. West, Limpopo, E. Cape; feedlots: Gauteng, Free State	~200–250 kg carcass (feedlot)	~1.0 MT/year; ~3.26M slaughtered (2022 FAO)

Sector	Species / Breed	Major Producers / Regions	Avg Productivity	National Production
Dairy	Holstein-Friesian, Jersey, Ayrshire	E. Cape (Tsitsikamma), KZN, W. Cape, Free State; ~1,300 producers	~6,000–8,000 L/cow/year (commercial)	~3.2–3.4 billion litres/year (Milk SA)
Sheep (Wool)	Merino, Dohne Merino	E. Cape, Free State, N. Cape; ~8,000 wool producers	~4–5 kg greasy wool/sheep/year	~45,000–50,000 t/year; SA 4th globally
Sheep (Meat)	Dorper, SA Mutton Merino, Ile de France	N. Cape (Karoo Lamb GI), Free State, E. Cape	~18–22 kg carcass	~4.5-5.0M slaughtered (2022 FAO)
Broiler Poultry	Ross 308, Cobb 500, Arbor Acres	KZN, N. West, Mpumalanga, W. Cape; RCL Foods, Astral, Country Bird	~2.0–2.2 kg in ~32–35 days	~1.8–2.0 MT/year; #1 protein source
Layer Eggs	Hy-Line, Lohmann	Gauteng, N. West, Free State; ~27.6M layers (SAPA)	~300 eggs/bird/year	~7.5–8.0 billion eggs/year
Angora Goats (Mohair)	SA Angora	E. Cape (Graaff-Reinet, Cradock, Somerset East)	~3.5–4.5 kg mohair/goat/year	~2,000–2,500 t/year; ~50% of world supply
Ostrich	SA Black, Zimbabwean Blue	Klein Karoo (Oudtshoorn), W. Cape	~90–100 kg meat/bird	World's largest; meat + leather + feathers exported

SECTION 8: FISHERIES & AQUACULTURE SECTOR

8.1 Fisheries Resource Base

Total Coastline	~2,798 km (Atlantic + Indian Ocean)
EEZ (Exclusive Economic Zone)	~1.535 million km² (among Africa's largest)
Major Fishing Zones	West Coast (cold Benguela – hake, anchovy, sardine, rock lobster); South Coast (squid); East Coast (warm Agulhas – line fish, prawns)

8.2 Production Statistics

Total Marine Capture	~580,000–600,000 t/year (DFFE); hake ~140,000 t, small pelagics ~300,000 t. SA hake is MSC-certified.
Aquaculture Production	~7,000–9,000 t/year (DFFE) – small. Abalone ~1,800 t (world's largest farmed outside Asia), mussels, oysters, trout, tilapia.
Key Export Species	Hake (EU, Spain, Australia); abalone (East Asia – premium); rock lobster; squid (chokka)
Per Capita Consumption	~7–8 kg/year (below global ~20 kg; DFFE)
Employment	~27,000 direct; ~100,000 in value chain (DFFE)
Aquaculture Development	Operation Phakisa target: 15,000+ t/year; key constraints: regulatory complexity, poaching (abalone), financing

SECTION 9: GOOD AGRICULTURAL PRACTICES & SUSTAINABLE FARMING

9.1 GAP Certification & Standards

National GAP Standard	GLOBALG.A.P. widely adopted by export farms; SA-GAP (local adaptation); HACCP, ISO 22000 for processing; Integrated Production of Wine (IPW) for wine sector
International Certifications	Rainforest Alliance (fruit/tea); Fairtrade (wine, fruit, rooibos); FSC (forestry); MSC (hake fishery); BRC (food safety for export)
Organic Farming	~50,000–70,000 ha certified organic; rooibos and wine sectors leading adoption; growing but small relative to total area

9.2 Integrated Pest Management

National IPM Policy	DALRRD Plant Health directorate; CARA Act 43 of 1983 regulates pest/weed control; Fertilizers, Farm Feeds, Seeds and Remedies Act (Act 36 of 1947)
Key IPM Programs	Sterile Insect Technique (SIT) for Mediterranean fruit fly (Citrus Research International – largest SIT programme in Southern Hemisphere); Integrated pest management for citrus, deciduous fruit, grain
Biological Control	ARC's Plant Health and Protection division; biocontrol agents for citrus psylla, grain insects; classical biocontrol for alien invasive weeds (e.g., cochineal on cactus, Bruchidius on Australian Acacia)
Pesticide Regulation	Act 36 of 1947; Registrar of Act 36 (DALRRD) approves all agricultural remedies; MRL enforcement aligned with Codex/EU standards for export compliance
Fall Armyworm Response	Detected in SA in 2017; DALRRD/ARC emergency response; Bt maize provides partial resistance; scouting protocols and IPM guidelines disseminated to smallholders

9.3 Post-Harvest Management Practices

Cold Chain Infrastructure	Well-developed for export fruit (citrus, deciduous, grapes); SA has ~50+ cold stores at ports (Cape Town, Durban); controlled atmosphere (CA) storage for apples/pears; total cold storage capacity among largest in Africa
Grain Storage	~19–20 MT commercial silo capacity (JSE-registered silos); major operators: Senwes, VKB, OVK, NWK, GWK. Grain stored to SAFEX standards. Strategic reserves managed by DALRRD.
Food Processing	Large agro-processing sector: Tiger Brands, Pioneer Foods, RCL Foods, Astral Foods; contributes ~5% of GDP. Fruit canning (Langeberg), wine making, sugar milling (Tongaat Hulett, Illovo), maize milling, meat processing.
Post-Harvest Losses	~30–34% of food lost/wasted in SA food system (CSIR estimate); fresh produce ~20–25% losses mainly at farm-retail stages; grain losses relatively low (~3–5%) due to modern silo infrastructure
Phytosanitary Compliance	SA's export success depends on strict phytosanitary protocols: cold treatment for citrus (Citrus Black Spot management for EU market);

	DALRRD inspection services; PPECB (Perishable Products Export Control Board) certifies all perishable exports

9.4 Farm Mechanisation

Commercial Farm Mechanisation	Highly mechanised – comparable to developed world; centre-pivot irrigation, GPS-guided tractors, combine harvesters, mechanical grape/fruit harvesters
Tractor Density	~120,000–130,000 tractors in use nationally (SAAMA estimates); ~1 tractor per 30–35 ha cultivated (commercial sector)
Smallholder Mechanisation	Very low – majority rely on hand tools or animal draught; DALRRD mechanisation hubs provide access to shared equipment; CASP grants fund mechanisation for emerging farmers
Major Equipment Brands	John Deere, CLAAS, New Holland, Massey Ferguson, Case IH (all assembled/distributed locally); SA-manufactured: Bell Equipment (articulated dump trucks), Falcon (trailers)
Precision Agriculture Adoption	~20–30% of large commercial farms use GPS guidance, yield mapping, variable rate technology; adoption growing via agritech firms (Aerobotics, FarmSol)
NAMPO Harvest Day	Africa's largest agricultural equipment expo; held annually in Bothaville, Free State (May); showcases latest mechanisation and technology

SECTION 10: AGRICULTURAL EXPORT COMMODITIES & TRADE

10.1 Overall Agriculture Trade Profile

Trade Balance	South Africa is a net agricultural exporter in most years; competitive in fruit, wine, maize, wool, sugar
Agricultural Imports (2024)	Major imports: milled rice (R11,740M), wheat (R9,852M), palm oil (R9,127M), sugar cane (R3,762M), food preparations (R3,288M) – DALRRD Economic Review 2024
Top Import Sources	Thailand (rice), Argentina/Russia/Australia (wheat), Indonesia/Malaysia (palm oil), Brazil (chicken, soybeans)
Trade Agreements	WTO; AfCFTA; SADC Trade Protocol; SACU; EU-SADC EPA; AGOA (US)

10.2 Top Agricultural Export Commodities

Rank	Commodity	Export Value (R million, 2023/24)	Key Destinations	SA Global Ranking
1	Oranges	~14,388	Netherlands, UK, China, Middle East	2nd largest citrus exporter
2	Maize	~14,160	Zimbabwe 30%, Botswana, Vietnam, Namibia	Top 10 exporter
3	Grapes	~12,193	EU, UK, Far East	Top 5 table grape exporter
4	Apples	~10,524	UK, Far East, Africa, EU	Top 10 exporter
5	Wine	~10,210	UK, EU, US, Canada, China	8th–10th largest producer
6	Wool (greasy)	-	China, Italy, Czech Republic	4th largest producer
7	Macadamia Nuts	-	US, EU, East Asia	One of the world's largest producer
8	Sugar	-	SADC region, EU, East Africa	Top 15 producer

10.3 Export Destinations (Top 5, 2023/24 DALRRD)

Rank	Country	Export Value (R million)
1	Netherlands	26,068
2	Zimbabwe	19,856
3	United Kingdom	16,757
4	China	13,817
5	Botswana	13,553

10.4 Export Challenges & Opportunities

Key Challenges	EU phytosanitary barriers (Citrus Black Spot/CBS – ongoing trade dispute); port congestion (Transnet inefficiencies at Durban/Cape Town); load-shedding impacting cold chains; rising input costs (fertiliser, fuel); land reform uncertainty; cheap poultry imports undermining local industry

Key Opportunities	AfCFTA opening ~1.3 billion consumer African market; growing Asian demand for protein/fruit; macadamia nut boom; avocado global demand surge; rooibos tea expanding; premium wine market growth; AGOA access (if renewed)
Competitiveness	Counter-seasonal advantage to Northern Hemisphere (fruit exports peak Jan–Jun when EU/US supply low); advanced phytosanitary infrastructure; diversified agri-export basket reduces commodity risk

SECTION 11: COMMERCIAL & EMERGING TECHNOLOGIES IN AGRICULTURE

11.1 Digital & Precision Agriculture

Satellite/Remote Sensing	ARC uses Landsat/Sentinel for crop area estimation; DALRRD CEC uses satellite + field surveys; commercial services: Aerobotics (drone + satellite analytics – SA-founded, now global)
AI/ML in Agriculture	Aerobotics: AI-powered pest/disease detection from aerial imagery; FarmSol: digital farm management; Khula! marketplace; growing agritech startup ecosystem (>50 agritech companies)
IoT/Smart Farming	Soil moisture probes, weather stations, pivot monitoring on ~20–30% of large commercial farms; SeeTree (tree crop analytics); Mezzanine (remote farm monitoring)
Drone Technology	Used for crop scouting, spray application (citrus, forestry), game counting on wildlife ranches; regulatory framework under SA Civil Aviation Authority
Blockchain/Traceability	Pilot stage: wine industry traceability (Stellenbosch); beef supply chain tracking; fruit export chain documentation

11.2 Biotechnology & Crop Improvement

GM Crop Status	SA is Africa's GM pioneer: commercial since 1998. ~2.7M ha (2014 ISAAA). Bt maize (MON 810, MON 89034); HT maize (NK 603); Bt/HT stacked. HT soya (Roundup Ready). Bt cotton. Regulated under GMO Act 15 of 1997.
WEMA/TELA Programme	ARC + CIMMYT + AATF: drought-tolerant + Bt maize (TELA) commercialised in SA since 2016; 106 DroughtTEGO hybrids released; royalty-free to smallholders
Seed Sector	Dominated by multinationals: Bayer/Monsanto, Corteva/Pioneer, Syngenta, PANNAR (Corteva). ARC breeds public varieties. SA Cultivar and Technology Agency (SACTA) manages variety listings.
Marker-Assisted Breeding	ARC and universities (Stellenbosch, Pretoria, KZN) use MAS for disease resistance in wheat (rust), maize (grey leaf spot), sugarcane (smut/eldana)
CRISPR/Gene Editing	Research stage at ARC, Stellenbosch University, University of Pretoria; no commercial gene-edited crops yet; regulatory framework under GMO Act (classified as GM)

11.3 Protected Cultivation & Controlled Environment

Greenhouse Area	~2,000–3,000 ha under greenhouses/tunnels nationally (relatively small); concentrated in Limpopo (tomatoes, peppers), W. Cape (herbs, flowers), Gauteng (nurseries)
Shade Netting	Growing rapidly for subtropical fruit (citrus, avocados) to protect against hail, sunburn, wind; several thousand ha in Limpopo/Mpumalanga
Hydroponics/Vertical Farming	Emerging sector: Farmercise, Future Farms Africa, and several startups; lettuce, herbs, microgreens primarily; constrained by energy costs (load-shedding)

Nursery Sector	Well-developed: Citrus Research International (CRI) certified disease-free nurseries for citrus; Vitiplant (virus-free grapevine material); ARC fruit tree schemes
Controlled Atmosphere Storage	Advanced CA/MA storage for apples, pears, grapes for export; critical for 6–8 week sea freight to Far East markets
Key Constraints	High energy costs (load-shedding makes greenhouse climate control expensive); water scarcity in some regions; high capital costs; limited local greenhouse manufacturing

11.4 SA Agricultural Innovations Relevant for India/BRICS Exchange

Innovation	Sector	SA Strength	India Application	Impact
Dryland Maize Breeding	Crop Science	ARC WEMA/TELA drought-tolerant varieties	India's rainfed maize areas (Bihar, MP, Rajasthan)	20–35% yield improvement under drought
Karoo Lamb GI	Livestock	GI-protected premium rangeland lamb	India's GI livestock products	Premium marketing of pastoral products
Conservation Agriculture	Soil Science	400,000+ ha CA; Grain SA extension	India's Indo-Gangetic Plains	Reduce tillage costs, save water, improve soil
Sugarcane R&D (SASRI)	Agro-Industry	SASRI breeding, agronomy, co-generation	India's UP/Maharashtra sugar belt	Variety exchange; ethanol; co-gen technology
Wine Technology	Horticulture	World-class R&D (Stellenbosch Uni, SAWIS)	India's Nashik/Karnataka wine industry	Vine management, cellar tech, marketing
Wildlife Ranching	Biodiversity	~10,000 ranches; conservation + revenue model	India's wildlife corridors	Community conservation; eco-tourism revenue
Citrus Export Protocols	Trade	World's 2nd largest citrus exporter; CRI phytosanitary systems	India's citrus exports (Nagpur, NE India)	Cold chain; CBS management; EU market access
JSE Agri Derivatives	Finance	Africa's most liquid agri futures market	India's NCDEX/MCX development	Price discovery; risk management; hedging models

SECTION 12: AGRICULTURAL PRODUCE, FOOD SECURITY & NUTRITION

12.1 Production Overview

Gross Value of Agri Production	~R450B (2024 est., DALRRD)
Field Crop Gross Value	~R117,000M (2024 DALRRD) – maize 47.5%, sugarcane 13.8%, soya 12.8%, wheat 9.6%
Horticulture Gross Income	Increased by 8.4% in 2024; prior year was~R133,306M (as per Economic Review, DALRRD)
Animal Products Income	~R193,869M (year ended Jun 2024, DALRRD. +6.1% YoY)
Net Farm Income (2024)	~R130,712M (+13.9% vs 2023, DALRRD)
Volume (2024)	1.5% less than 2023; field crops -15.6% (El Niño); horticulture increased

12.2 Food Security & Nutrition

National Status	Food-secure nationally (net exporter); food-insecure at household level (~20–25% experience hunger, Stats SA GHS)
Undernourishment	~7–9% (FAO SOFI)
Stunting (under 5)	~27% (2016 SADHS)
Obesity (adults)	~28–30% obese (WHO/SADHS); ~68% women overweight/obese – dual burden
GFSI Rank	~70th–75th globally (EIU)
Social Protection	SRD Grant (R370/month); child support grants; school feeding (9.6M learners/day)
Per Capita Maize	~81 kg white maize meal/year (staple)

SECTION 13: KNOWLEDGE EXCHANGE – BEST PRACTICES & LEARNING

13.1 What South Africa Can Offer BRICS Nations

#	Achievement	Description and Impact
1	World's 2nd Largest Citrus Exporter	R14.4B exports; advanced cold chain; phytosanitary compliance 100+ markets; CGA model
2	GM Crop Pioneer in Africa	~2.7M ha; only major African GM adopter; 25+ year record; GMO Act 1997 regulatory model
3	Conservation Agriculture at Scale	400,000+ ha no-till; ARC/Grain SA extension; 30% input cost reduction proven
4	Wine Industry Excellence	8th–10th globally; R10.2B exports; Stellenbosch/Franschhoek; IPW sustainable certification
5	Wildlife Ranching Model	~10,000 ranches; ~20M game; R14B+ industry; conservation-compatible revenue model
6	Mohair & Wool	World's #1 mohair (~50% global); 4th wool; premium fibre exports
7	SASRI Sugarcane Research	World-class breeding, agronomy, pest/disease management
8	JSE Agri Derivatives	Africa's most liquid agri futures; price discovery for maize, wheat, soya, sunflower

13.2 What SA Can Learn from BRICS

#	Area	From	Gap and Opportunity
1	Smallholder Organisation	India, China	2.5–4M households mostly subsistence; FPO/cooperative models needed
2	Rice Cultivation	India, China, Egypt	100% imported (~R11.7B/year); potential KZN/Mpumalanga wetlands
3	Aquaculture	China, Egypt, India	Only 7,000–9,000 t vs China 60M+; massive untapped potential
4	Protected Cultivation	UAE, Saudi Arabia, China	Greenhouse underdeveloped; arid-region horticulture innovation applicable to N. Cape
5	Digital Extension	India, Brazil	India's 731 KVKs; EMBRAPA model; SA needs scaled extension for emerging farmers
6	Dairy Intensification	India, Brazil	India's cooperative model; Brazil's tropical genetics could enhance SA's 3.3B L industry
7	Irrigation Efficiency	Israel, UAE	SA uses 60% of water for agriculture; precision irrigation transformative
8	Food Processing	Brazil, China, India	SA exports raw; value-addition models from BRICS could boost rural industrialisation

13.3 Agro-Climatic Matching – SA-India

SA Region	India State	Climate	Crops	Tech Transfer
Free State	Maharashtra (Vidarbha)	Semi-arid summer plateau	Maize, soya	GM maize; CA; drought varieties
Western Cape	Punjab	Winter rainfall/irrigated	Wheat, grapes	Wine tech; canola; precision irrigation

SA Region	India State	Climate	Crops	Tech Transfer
KZN coast	Karnataka/Kerala	Subtropical, humid	Sugarcane, avocados	SASRI varieties; ethanol co-gen
Limpopo Lowveld	Gujarat/Rajasthan	Hot, semi-arid	Citrus, mangoes	Citrus protocols; cold chain
Eastern Cape	Tamil Nadu	Temperate coastal	Dairy, pineapples	Dairy cooperatives; Amul model
N. Cape (Karoo)	Rajasthan (Thar)	Arid rangeland	Sheep, grapes	Karoo Lamb GI; mohair; irrigation
Mpumalanga	MP/Chhattisgarh	Summer plateau	Forestry, maize	Plantation forestry; pulp tech
Garden Route	Konkan coast	Moderate coastal	Dairy, fynbos	Eco-tourism + agriculture

SECTION 14: REFERENCES, DATA SOURCES & ANNEXURES

14.1 Primary Data Sources

Stats SA	Mid-Year Population (P0302) 2024; GDP Q4 2024 (P0441); QLFS; Census 2022. statssa.gov.za
DALRRD	Economic Review SA Agriculture 2024; Trends 2024; Crops & Markets Q1 2024; CEC. nda.gov.za
ARC	Soil surveys, crop breeding (WEMA/TELA), livestock research. arc.agric.za
NAMC	Commodity reports, market intelligence. namc.co.za
FAOSTAT	Production, trade, land use. faostat.fao.org
World Bank WDI	GDP, population, arable land. data.worldbank.org
USDA-FAS	Commodity reports SA. fas.usda.gov
IMF WEO	GDP, per capita. imf.org/weo
UNDP HDR	Human Development Index. hdr.undp.org
Industry Bodies	SAPA, Milk SA, SASA, CGA, SAWIS, Grain SA, BFAP
SAWS	Climate data. weathersa.co.za
ISAAA	GM crop statistics. isaaa.org

14.2 Glossary

Term	Definition
ARC	Agricultural Research Council
BFAP	Bureau for Food and Agricultural Policy
CEC	Crop Estimates Committee (DALRRD)
CGA	Citrus Growers' Association
DALRRD	Dept of Agriculture, Land Reform & Rural Development
DFFE	Dept of Forestry, Fisheries & Environment
JSE	Johannesburg Stock Exchange (agri derivatives)
NAMC	National Agricultural Marketing Council
SAPA	South African Poultry Association
SASA	SA Sugar Association
SASRI	SA Sugarcane Research Institute
Stats SA	Statistics South Africa
SACU	Southern African Customs Union
Karoo Lamb	GI-protected premium lamb from semi-arid Karoo