SECTION 1: COUNTRY OVERVIEW & GEOGRAPHIC PROFILE

1.1 Basic Country Information

Country Name	Islamic Republic of Iran
Capital City	Tehran – population ~9–10 million (metro: ~16 million)
BRICS Status	Full Member – Joined BRICS on 1 January 2024 (accepted at Johannesburg Summit, August 2023)
Total Population	~86.2 million (SCI/FAO 2023); ~88 million (2024 est.) – world's 17th–18th most populous
Population Growth Rate	~0.7–0.8% per year (SCI); declining fertility rate (~1.7 children/woman)
Rural Population (%)	~24–26% (World Bank/SCI); declining due to urbanisation
Urban Population (%)	~74–76% (2024, World Bank/SCI)
GDP (Nominal)	USD 436.91 billion (2024, World Bank); Rials 22,000+ trillion at official rates; +3.5% real growth (2024, IMF est.)
GDP per Capita	USD 5,778.66 (2024, Trading Economics/World Bank); PPP: ~USD 16,000–17,000
Agriculture's Share of GDP	~10% of GDP (Trading Economics/World Bank 2024); agriculture and related industries: ~14.8% of employment (FAO Iran)
Agriculture's Share of Employment	~14.8–18% of workforce (~5–6 million agricultural workers; FAO/ILO/SCI)
HDI Rank	0.780 (2023/24, UNDP) – High Human Development; ~76th globally
Official Language(s)	Persian (Farsi) – official; Azerbaijani Turkish, Kurdish, Luri, Balochi, Arabic, Turkmen also spoken
Currency	Iranian Rial (IRR); highly depreciated: ~500,000–600,000 IRR/USD (free market 2024); official rate differs significantly

1.2 Geographic Coordinates & Physical Extent

Total Geographic Area	1,648,195 km² – world's 17th largest country; 2nd largest in Middle East (after Saudi Arabia)
Northernmost Point	39°47′ N (Azerbaijan border, East Azerbaijan Province)
Southernmost Point	25°03′ N (Strait of Hormuz, Hormozgan Province)
Easternmost Point	63°20′ E (Afghanistan/Pakistan tri-border, Sistan-Baluchestan)
Westernmost Point	44°02′ E (Iraq/Turkey border, West Azerbaijan Province)
Coastline	~2,440 km (Persian Gulf + Gulf of Oman: ~1,770 km; Caspian Sea: ~670 km)
Land Borders	~5,894 km (borders 7 countries: Iraq, Turkey, Armenia, Azerbaijan, Turkmenistan, Afghanistan, Pakistan)
Highest Point	Mount Damavand, 5,610 m (Alborz Mountains) – highest volcano in Asia
Major Rivers	Karun (890 km – only navigable river), Dez, Karkheh, Zayandeh-Rud, Sefid-Rud, Atrak; most are seasonal/intermittent

Major Deserts	Dasht-e Kavir (Great Salt Desert, ~77,000 km²); Dasht-e Lut (Lut Desert – UNESCO World Heritage; hottest surface temperature on Earth recorded: 70.7°C)

1.3 Administrative Divisions

Primary Level	31 provinces (ostan)
Secondary Level	429 counties (shahrestan)
Tertiary Level	1,057 districts (bakhsh); ~2,589 cities (shahr); ~39,000+ villages (dehestan/abadi)
Key Agricultural Provinces	Khuzestan (wheat, sugarcane – SW Iran); Fars (wheat, barley); Khorasan Razavi (saffron, wheat); Kerman (pistachio, dates); Gilan/Mazandaran (rice, tea – Caspian coast); East/West Azerbaijan (wheat, dairy); Isfahan (wheat, industry)

SECTION 2: AGRO-CLIMATIC ZONES & CLASSIFICATION

2.1 National Classification

System	Iran Meteorological Organisation (IRIMO) / Ministry of Agriculture Jihad (MAJ) zonation; based on De Martonne aridity index and Köppen system
Total Zones	5 major agro-climatic zones: Caspian Humid, Semi-Arid (Zagros), Arid/Desert Interior, Mediterranean West, Tropical South Coast
Basis	Rainfall, temperature, altitude, aridity index; Iran is predominantly arid/semi-arid (~85% of territory)

2.2 Zone-wise Description

Zone	Region	Climate	Crops	Challenges
1. Caspian Humid	Gilan, Mazandaran, Golestan (N)	Humid subtropical; 800–2,000 mm rain; mild winters; high humidity	Rice (#1 region), tea, citrus, kiwi, silk, tobacco; forest products	Flooding; waterlogging; limited arable land; urbanisation
2. Semi-Arid Zagros	W/NW Iran: Kurdistan, Hamedan, Kermanshah, Lorestan, Chaharmahal	Semi-arid continental; 350–800 mm; cold winters; mountain valleys	Wheat, barley, walnuts, grapes, apples, cherries; livestock (sheep/goat)	Erosion; deforestation; water scarcity; harsh winters; small farms
3. Arid/Desert Interior	Isfahan, Yazd, Kerman, S. Khorasan, Semnan, Central Plateau	Arid; <200 mm rain; extreme temperature range (-20 to +50°C)	Pistachio (Kerman), saffron (Khorasan), dates, wheat (irrigated), barley	Severe water crisis; qanat depletion; desertification; dust storms
4. Mediterranean West	Khuzestan, Fars, Bushehr (lowland SW)	Hot semi-arid/Mediterranean; 200–500 mm winter rain	Wheat (#1 province: Khuzestan), sugarcane, dates, rice, vegetables	Heat extremes (50°C+); salinity; dust storms; river flow reduction
5. Tropical South Coast	Hormozgan, Sistan-Baluchestan (SE)	Hot tropical; 100–300 mm; very high humidity on coast	Dates, mangoes, bananas, shrimp aquaculture; fisheries	Extreme heat; poverty; water scarcity; cyclone risk; underdeveloped

SECTION 3: CLIMATE, RAINFALL & TEMPERATURE EFFECTS ON AGRICULTURE

3.1 Overall Climate

Köppen Classification	Predominantly BWk/BSk (Cold Arid/Semi-Arid – Central Plateau); Csa (Mediterranean – Zagros foothills); Cfa (Humid Subtropical – Caspian); BWh (Hot Arid – SE coast/Khuzestan lowlands)
National Avg Rainfall	~250 mm/year (one-third of world average; one of driest countries for its latitude); highly uneven distribution
Water Crisis	Iran's #1 agricultural challenge: groundwater overdraft has caused >600 plains to be classified as 'prohibited' or 'critical'; Lake Urmia lost ~90% of surface area; many rivers running dry

3.2 Rainfall & Temperature

Highest Rainfall	Caspian coast (Gilan/Mazandaran): 1,200–2,000 mm
Lowest Rainfall	Dasht-e Lut / SE Iran: <50 mm; Shahdad (Kerman): <30 mm
Hottest Region	Dasht-e Lut: surface temp 70.7°C (NASA satellite); air temp >50°C in Khuzestan, Ahvaz
Coldest Region	NW Iran (Sarab, Ardabil, Hamedan): -30 to -40°C in winter
Drought Impact	Recurring droughts (2018–2024): reduced wheat production; triggered livestock destocking; Lake Urmia drying; Zayandeh-Rud (Isfahan) runs dry regularly

3.3 Climate-Resilient Agriculture and Climate Action

Initiative	Institution	Description	Impact
Qanat Rehabilitation	Ministry of Agriculture Jihad / UNESCO	Ancient underground irrigation channels (qanats) – Iran has ~37,000 qanats; UNESCO Heritage. Rehabilitation programme to restore abandoned systems.	Sustainable groundwater use; some qanats >2,000 years old; cultural heritage preservation
Modern Irrigation Expansion	Ministry of Energy / MAJ	Pressurised irrigation (drip/sprinkler) expansion; USD 35M+ investment; target: convert 50% of irrigation to modern methods	Drip/sprinkler coverage growing from ~20% to target ~40–50%; water savings 30–50%
Lake Urmia Restoration	ULRP (Lake Urmia Restoration Programme)	UNDP/Japan-supported; USD 130M+ invested; water transfer, efficiency improvements, farming pattern changes	Lake level partially recovered; farmers incentivised to switch from water-intensive crops
Wheat Self-Sufficiency Drive	MAJ / Government	Guaranteed wheat procurement price raised 50% (IRR 17,500/kg in 2024; IRR 20,500/kg for 2025 crop); input subsidies	Govt procured 12 MT wheat in 2024 (+16% YoY, FAO GIEWS); approaching self-sufficiency in good years
Greenhouse Expansion	MAJ / Private Sector	Iran has ~13,000–15,000 ha of greenhouses (growing rapidly); focus on vegetables, flowers, cucumbers, tomatoes	Reduces water use 70–90%; year-round production; Kerman, Isfahan, Fars, Tehran provinces

Initiative	Institution	Description	Impact
Saffron/Pistachio Drip Irrigation	Provincial agriculture departments	Converting traditional flood irrigation for high-value crops to drip; especially in Kerman (pistachio) and Khorasan (saffron)	Water savings; yield improvements; export quality maintenance

SECTION 4: CROPPING PATTERNS & AGRICULTURAL CALENDAR

4.1 Seasonal Cropping System

Season	Months	Regions	Major Crops
Autumn/Winter Planting	Oct–Dec	W/NW/SW Iran (rainfed + irrigated)	Winter wheat (#1 crop), barley, rapeseed, lentils; autumn sowing of sugarcane ratoons
Spring Planting	Mar–May	All regions (irrigated)	Rice (Caspian), maize, cotton, sugar beet, vegetables, melons, spring wheat (NE)
Summer Harvest	Jun–Aug	Nationwide	Wheat harvest (Jun–Jul); barley; stone fruits; melon/watermelon
Autumn Harvest	Sep–Nov	Nationwide	Rice, saffron (Oct–Nov), pistachio (Sep), dates, grapes, apples, pomegranates, sugar beet
Year-Round (Perennials)	Year-round	Kerman, Fars, Khorasan, Caspian	Pistachio orchards, date palms, citrus, walnut, almond, tea; saffron (crocus harvested Oct–Nov only)

4.2 Major Food Crops

Wheat	~14–15 MT (2024, USDA-FAS/MAJ); ~6.5–7.0M ha planted; yield ~2.1–2.3 t/ha. Iran's #1 crop. Govt procured ~12 MT in 2024 (+16% YoY, FAO GIEWS Nov 2024). Approaching self-sufficiency; annual requirement ~11.5 MT for food.
Barley	~3.0 MT (2023/24, USDA); ~1.5–1.6M ha; mainly for animal feed and malt. Key provinces: Khorasan, Fars, Kurdistan.
Rice	~1.9–2.2 MT paddy (USDA/FAO); ~0.55–0.6M ha; Caspian provinces (Gilan, Mazandaran) produce ~80%. Annual consumption ~3 MT – deficit imported (~0.8–1.5 MT from India, Pakistan, Thailand).
Maize (Corn)	~1.4 MT (USDA 2023/24); irrigated; mainly for animal feed; Khuzestan, Fars, Kermanshah. Imports ~9–10 MT corn for feed (Iran is one of world's largest corn importers).
Sugar Beet	~5–7 MT (FAO/MAJ); key sugar crop in temperate zones: Khorasan, Fars, Kermanshah, Hamedan. Sugar beet provides ~60% of Iran's sugar production.
Sugarcane	~5–6 MT cane (FAO); Khuzestan Province (Haft Tappeh, Karoun complexes). Provides ~40% of sugar.
Potatoes	~5.5–6.0 MT/year (FAO) – Hamedan Province is #1; also Ardabil, Isfahan, Khorasan.

4.3 Cash Crops & Industrial Crops

Pistachio	Among world's top producers: ~200,000–225,000 t/year (USDA 2025); Kerman Province (~80%); Rafsanjan is pistachio capital. ~18% of global output. Export value: ~$1.5–2.0B/year.
Saffron	World's #1 producer: ~90% of global output; ~350–400 t/year (Iran Saffron Council); Khorasan Razavi, South Khorasan, North Khorasan provinces. World's most expensive spice.

Dates	World's 3rd largest producer: ~1.1–1.3 MT/year (FAO); Kerman, Hormozgan, Sistan-Baluchestan, Khuzestan, Bushehr. Major varieties: Mazafati, Piarom, Rabbi, Zahedi.
Raisins/Grapes	~2.0 MT grapes (FAO); Takestan (Qazvin), Malayer, Khorasan.
Apples	~2.0 MMT (FAO) – world's 5th largest producer; West Azerbaijan, East Azerbaijan, Khorasan.
Cotton	~0.1–0.15 MT (declining); Golestan, Khorasan, Fars. Historically important but area shrinking due to water scarcity.
Walnuts	~386 kt (FAO 2021) – world's 3rd largest producer; Hamedan, Kurdistan, Kermanshah.
Tea	~109-190 kt (FAO); Gilan, Mazandaran (Caspian coast). Consumption ~100,000 t/year – large deficit imported from India, Sri Lanka.
Cumin/Spices	Iran is a major cumin producer; also sumac, barberries (berberis – world's #1 producer), turmeric.

4.4 Cropping Intensity & Productivity

Total Cultivated Area	~12 million ha annually cultivated (FAO Iran); arable land: ~14-18 million ha (one-third of total suitable area due to water constraints)
Total Agricultural Output	~57.5 MT of agricultural products per year (FAO Iran country brief)
Wheat Yield	~2.0–2.6 t/ha national avg (USDA); irrigated: 3.0–4.0 t/ha; rainfed: 1.0–1.5 t/ha
Cropping Intensity	~100–120% (limited by water; mostly single crop in rainfed areas; double in irrigated Khuzestan/Caspian)
Key Constraint	WATER: ~85-90% of territory is arid/semi-arid; 92% of water consumption goes to agriculture; groundwater depletion catastrophic in many basins

4.5 Major Crop Varieties and Yield/ha

Crop	Varieties	Avg Yield (t/ha)	Notes
Wheat (Irrigated)	Chamran 2, Pishtaz, Sivand, Parsi, Behrang (SPII/Seed & Plant Improvement Institute)	3.0–4.0	~6.2–7.0M ha total; irrigated yields improving; rainfed highly variable
Wheat (Rainfed)	Sardari, Azar 2, Kermanshah varieties	1.0–1.5	Western Zagros; highly dependent on winter rainfall
Rice	Tarom, Hashemi, Sadri, Fajr, Neda (Caspian varieties); Tarom is premium aromatic	5.1-5.3 (paddy)	~0.55–0.6M ha; Caspian coast; premium Iranian rice commands high domestic price
Barley	Reyhan, Kavir, Nosrat, Makouee	1.6–2.2 (USDA)	~1.5–1.6M ha; feed + malt; declining area
Pistachio	Akbari, Kalle-Ghouchi, Ahmad-Aghaei, Fandoghi (Kerman origin)	~0.1–4.0 (dry nut)	~400–600K ha orchards; alternate bearing; severe water stress threat

Crop	Varieties	Avg Yield (t/ha)	Notes
Saffron	Iranian crocus (Crocus sativus); cultivars by region	~3–6 kg/ha (stigma)	~120,000–130,000 ha; Khorasan; world's most expensive spice; hand-harvested
Dates	Mazafati, Piarom, Rabbi, Zahedi, Kabkab	5–8 (fruit/palm)	~200,000+ ha; Kerman, Hormozgan, Sistan-Bal.
Sugar Beet	Rasoul, IC varieties, European imports (KWS/SESVanderhave)	35–45 (roots)	~95,000–120,000 ha; Khorasan, Fars, Kermanshah

SECTION 5: AGRICULTURAL LAND USE & LAND RESOURCES

5.1 Land Use Classification

Total Geographic Area	164.8 million ha
Arable Land	~18–20 million ha potentially arable (Britannica/FAO); actually cultivated annually: ~12 million ha (FAO Iran)
Irrigated Cropland	~8–9 million ha (~55–60% of cultivated area; FAO AQUASTAT)
Rainfed Cropland	~4–5 million ha (~40–45% of cultivated area)
Orchards & Vineyards	~2.0–2.5 million ha (pistachio, dates, grapes, apples, citrus, walnuts, pomegranates)
Permanent Pastures/Rangeland	~90 million ha (~55% of total area; FAO/MAJ) – supports nomadic and semi-nomadic livestock
Forest	~12.4 million ha (~7.5% of total; mainly Caspian Hyrcanian forests – UNESCO Heritage; Zagros oak forests)
Desert/Barren	~54–65 million ha (~39% of total; Dasht-e Kavir, Dasht-e Lut, salt flats/kavirs)

5.2 Irrigation Infrastructure

Irrigated Area	~8–9 million ha (FAO AQUASTAT) – one of largest irrigated areas in Middle East; but efficiency very low (~35–40%)
Qanat System	~37,000 qanats historically; ~30,000+ still partially active; UNESCO Intangible Heritage; declining due to groundwater depletion and urbanisation. Ancient Persian engineering marvel (>3,000 years old).
Modern Irrigation	Drip/sprinkler: ~20–25% of irrigated area (expanding); govt target: 40–50% modern irrigation coverage. Major dams: Karkheh, Karun-3, Karun-4, Dez, Gotvand.
Dam Infrastructure	~700+ dams built/under construction (Iran Water Resources Management Co.); total reservoir capacity ~50+ billion m^3; but siltation and climate change reducing effective capacity
Water Source	Surface water: ~40%; groundwater: ~60% (dangerously over-extracted). >600 plains in 'prohibited' or 'critical' status for new wells.
Key Crisis	Iran extracts ~5–7 billion m^3/year MORE groundwater than is recharged; land subsidence in Tehran, Isfahan, Mashhad; Lake Urmia, Hamoun, Bakhtegan drying up

5.3 Land Tenure & Farm Structure

Post-Revolution Reform	1979 revolution + land reform distributed large estates to smallholders; most farms now privately owned
Average Farm Size	~5–7 ha per holding (SCI Agricultural Census); highly fragmented; ~2.5–3 million farming households
Nomadic/Pastoralists	~1.0–1.5 million nomadic and semi-nomadic pastoralists (Qashqai, Bakhtiari, Turkmen, Baluch, Kurdish tribes); manage large sheep/goat herds on rangeland

Government Farms	Some state-owned agro-industrial complexes (e.g. Haft Tappeh sugarcane; Karoun sugar); declining role

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

6.1 Soil Classification System

System	Iranian Soil Classification / mapped to USDA Soil Taxonomy and WRB; Iranian Soil Science Society
Survey Authority	Soil & Water Research Institute (SWRI) under Agricultural Research, Education and Extension Organisation (AREEO); Iranian Remote Sensing Centre

6.2 Major Soil Types

Soil Type	Region	Properties	Suitable Crops
Aridisol/Calcisol	Central Plateau, Interior Basin	Calcareous; alkaline pH 7.5–8.5; low OM (<1%); saline in depressions	Wheat, barley (irrigated); pistachio on deep soils; dates in oases
Entisol/Regosol	Desert margins, alluvial fans, river valleys	Young; variable; often sandy/silty; low OM	Irrigated crops where water available; melon, wheat, vegetables
Inceptisol	Zagros foothills, W/NW Iran	Moderately developed; moderate fertility; clay-loam	Wheat, barley, legumes, orchards (walnut, apple, cherry)
Alfisol/Luvisol	Caspian lowlands, some Zagros valleys	Relatively fertile; higher OM (2–4%); clay-rich	Rice, tea, citrus, vegetables – Iran's most productive soils
Vertisol	Khuzestan lowlands, parts of Fars	Shrink-swell clay; cracking; moderate-high fertility	Wheat, sugarcane, rice; drainage issues in wet season
Solonchak/Solonetz	Kavir margins, coastal Persian Gulf, Sistan	High salinity/sodicity; white salt crusts; barren in extreme	Salt-tolerant crops only; halophyte grazing; reclamation difficult

6.3 Soil Degradation & Conservation

Salinisation	~25–30 million ha affected by various degrees of salinity (SWRI); secondary salinisation from poor irrigation management; Khuzestan, Isfahan, Sistan particularly affected
Water Erosion	~12.5 million ha subject to severe water erosion (Zagros slopes; Alborz); sheet and gully erosion from deforestation and overgrazing
Wind Erosion	~19 million ha subject to wind erosion; SE Iran (Sistan) and Central Plateau; dust storms increasingly severe, impacting health and agriculture
Desertification	~30+ million ha at risk; Iran is one of world's most desertification-prone countries; sand dune encroachment threatening villages
Conservation	FRWO (Forests, Range and Watershed Management Organisation): reforestation, rangeland rehabilitation, windbreak planting; International Hamoun Wetland project; UNCCD focal point

SECTION 7: LIVESTOCK SECTOR PROFILE

7.1 Livestock Population & Production

Sheep	~40–50 million head (FAO/SCI) – by far the most numerous livestock; nomadic and settled; breeds: Zel, Moghani, Lori-Bakhtiari, Ghezel, Afshari, Baluchi. Key provinces: East/West Azerbaijan, Kurdistan, Khorasan, Fars, Lorestan.
Goats	~18–25 million (FAO/SCI); important for nomadic/tribal communities; breeds: Raeini (cashmere), Markhoz (mohair), Tali, Najdi
Cattle	~7–8 million (FAO/SCI); dairy-focused; Holstein dominant in industrial farms; indigenous: Sarabi, Sistani, Golpayegani. Isfahan, Fars, Tehran, Khorasan.
Poultry	Very large sector: broiler industry produces ~2.5–3.0 MT chicken meat/year (industry estimates); ~1.0–1.1 billion broilers slaughtered/year; Iran is self-sufficient in chicken meat; per capita consumption ~30+ kg/year
Eggs	~1.0–1.1 MT/year (FAO/industry); Iran is largely self-sufficient; layer industry concentrated near major cities
Milk	~10–11 MT/year (FAO/SCI); cow milk ~80%; sheep/goat milk ~20%. Industrial dairy growing: Pegah, Kaleh, Mihan, Damdaran are major brands. Per capita consumption: ~70–80 kg/year.
Red Meat	~0.8–1.1 MT/year (lamb/mutton dominant, followed by beef/veal); production not meeting demand – imports of live cattle and frozen meat
Camel	~150,000–200,000 (FAO); SE Iran (Sistan-Baluchestan, Kerman, Yazd); camel milk and racing; declining
Buffalo	~0.2–0.5 million (FAO); Khuzestan, Gilan; water buffalo milk for dairy products

7.2 Livestock Production Summary

Sector	Breeds/Type	Major Regions	National Production
Sheep	Zel, Moghani, Ghezel, Lori, Baluchi, Afshari	Azerbaijan, Kurdistan, Khorasan, Fars, Lorestan	~40–50M head; lamb/mutton dominant red meat
Goats	Raeini (cashmere), Markhoz (mohair), Najdi	Kurdistan, Kerman, Khorasan, Sistan-Bal.	~18–25M head; fibre + milk + meat
Cattle (Dairy)	Holstein (industrial), Sarabi, Sistani	Isfahan, Khorasan, Tehran, Fars	~7–8M head; milk ~10–11 MT/year
Broiler Chicken	Ross 308, Cobb 500, Arbor Acres (imported GPS)	Isfahan, Tehran, Khorasan, Mazandaran, Fars	~2.5–3.0 MT meat; self-sufficient; ~30 kg/capita
Layer/Eggs	Hy-Line, Lohmann	Tehran, Isfahan, Khorasan, Markazi	~1.0–1.1 MT eggs/year
Buffalo	Khuzestani, Azari	Khuzestan, Gilan	~0.4–0.5M head; milk for dairy

SECTION 8: FISHERIES & AQUACULTURE SECTOR

8.1 Resource Base

Southern Waters	Persian Gulf + Gulf of Oman: ~1,700-1800 km coastline; warm tropical/subtropical waters; shrimp, tuna, sardine, grouper
Caspian Sea	~650-700 km coastline; brackish; historically famous for sturgeon and caviar; shared with Russia, Azerbaijan, Kazakhstan, Turkmenistan
Inland Waters	Rivers (Karun, Dez), reservoirs behind ~700 dams, qanat-fed pools; inland aquaculture growing

8.2 Production Statistics

Total Fisheries Production	~1.2–1.5 MT/year (FAO/Iran Fisheries Organisation – IFO); of which: marine capture ~0.7–0.8 MT; aquaculture ~0.4–0.5 MT; inland capture ~0.05–0.1 MT
Aquaculture	~0.4–0.8 MT/year (FAO/IFO); warm-water fish: tilapia, carp; cold-water: rainbow trout (~0.18–0.20 MT – Iran is one of world's top 5 trout producers); shrimp: ~0.03–0.05 MT (Hormozgan, Bushehr, Sistan-Bal.)
Shrimp Farming	~30,000–60,000 t/year; mostly vannamei; southern coast (Hormozgan, Bushehr, Sistan-Bal.); growing for export
Sturgeon/Caviar	Historically Iran was world's #1 caviar producer (Caspian beluga, osetra, sevruga); wild stocks critically depleted; now mostly farmed. Iran's Shilat Organisation manages sturgeon conservation + breeding. Caviar production: ~3–5 t/year (farmed).
Rainbow Trout	~180,000–200,000 t/year (IFO); Iran is among world's top 5 trout producers; Chaharmahal-Bakhtiari, Lorestan, Kermanshah (cold mountain streams)
Per Capita Consumption	~12–14 kg/year (low compared to global avg ~20 kg; government promoting fish consumption)

SECTION 9: GOOD AGRICULTURAL PRACTICES & SUSTAINABLE FARMING

9.1 GAP Certification & Standards

National Standards	ISIRI (Institute of Standards and Industrial Research of Iran) standards for food safety and quality; Iran National Standard (INS) for agricultural products; Halal certification mandatory for all meat products
International	GlobalG.A.P. adoption limited due to sanctions; ISO 22000 in some export-oriented processors; HACCP in major processing plants; Codex Alimentarius Commission membership
Organic	Growing niche: Iran Organic Association; organic saffron, pistachio, dates for export; certification bodies developing; EU/USDA organic certification sought by some exporters

9.2 Integrated Pest Management

National System	Plant Protection Organisation (PPO) under MAJ; pest/disease surveillance network; locust monitoring (Iranian Plateau is on desert locust pathway); Sunn pest (Eurygaster integriceps) is the #1 wheat pest
Key Programmes	Sunn pest aerial spraying programme (wheat fields in W/NW Iran); fruit fly monitoring in citrus/date regions; biological control programmes for greenhouse vegetables
Pesticide Regulation	PPO registers and regulates pesticides; subsidised pesticides distributed through agricultural service centres; overuse of pesticides is a concern in horticultural areas

9.3 Post-Harvest Management

Wheat Storage	21.41 MT capacity (158 silos: metal, concrete, mechanised – World Grain 2023); 18.01 MT long-term + 3.4 MT semi-mechanised. One of largest wheat storage capacities in Middle East. Government Trading Corporation (GTC) manages strategic reserves.
Cold Chain	Underdeveloped for fruits/vegetables; post-harvest losses estimated at 25–35% for perishables. Cold storage expanding in pistachio/saffron/date export chains.
Food Processing	Growing sector: ~12,000+ food industry entities (SCI); 328,000 workers; dairy processing (Pegah, Kaleh, Mihan); meat processing (~150 factories); fruit juice/concentrate; tomato paste (Iran is major producer).

9.4 Farm Mechanisation

Mechanisation Rate	~75–80% for wheat (planting/harvesting); lower for rice, horticulture; very low for livestock management
Tractor Fleet	~600,000 tractors (SCI); MF 285/399 (Massey Ferguson, locally assembled by ITMCO/Tractor Sazi Tabriz) is dominant; also John Deere, ITM, Goldoni. Many aging (>20 years).
Combine Harvesters	~30,000 (SCI); locally assembled (Claas/John Deere under licence); many aging and needing replacement

Tractor Manufacturing	Iran is a significant tractor manufacturer: ITMCO (Iran Tractor Manufacturing Co., Tabriz) produces ~30,000+ units/year; exports to Iraq, Afghanistan, Central Asia
Constraints	Sanctions limit access to modern precision agriculture equipment; fuel subsidies encourage mechanisation but aging fleet reduces efficiency; small farm size limits economics of large machinery

SECTION 10: AGRICULTURAL EXPORT COMMODITIES & TRADE

10.1 Trade Profile

Agricultural Exports	~$5–7 billion/year (CBI/MAJ); non-oil agricultural exports are a government priority to diversify away from petroleum dependence
Agricultural Imports	~$8–12 billion/year; major imports: corn (~9–10 MT for feed), wheat (variable: 0–5 MT depending on domestic harvest), soybeans (~2.1 MT), soybean meal (~1.8 MT), barley (~1.9 MT), rice (~0.8–1.5 MT), sugar, vegetable oil
Trade Balance	Net agricultural importer (especially feed grains and oilseeds); but net exporter of high-value speciality products (pistachio, saffron, dates, raisins)
Sanctions Impact	US sanctions (reimposed 2018) severely constrain financial transactions, shipping, insurance for agricultural trade; Iran trades primarily with China, Iraq, UAE, Turkey, Russia, CIS

10.2 Top Agricultural Export Products

Rank	Commodity	Description	Key Destinations
1	Pistachio	World's 1st-2nd producer/exporter; ~200,000–300,000 t/year; export value ~$1.5–2.0B	China, EU, Iraq, UAE, India, Turkey, Vietnam
2	Saffron	World's #1 (90% of global); ~400–500 t/year; ultra-high value (~$3,000/kg)	UAE, Spain, China, India, Japan, EU
3	Dates	World's 2nd–3rd exporter; ~400,000–600,000 t/year; Mazafati, Piarom, Rabbi	India, Pakistan, Russia, EU, Iraq, CIS
4	Raisins/Dried Fruits	World's 3rd largest raisin exporter; also dried figs, apricots, prunes	EU, Russia, India, Iraq, UAE
5	Fresh Fruits	Apples, citrus (oranges, tangerines), kiwi, pomegranates, watermelon	Iraq, UAE, Russia, Afghanistan, CIS
6	Tomato Paste	Major producer; concentrated tomato paste for export	Iraq, Afghanistan, CIS, Africa
7	Caviar (Farmed)	Historically world's #1; now mostly farmed (Beluga, Osetra); ultra-premium	EU, UAE, Japan, US (limited due to sanctions)
8	Confectionery/Sweets	Traditional sweets (Gaz, Sohan, halva); biscuits; chocolate	Iraq, Afghanistan, CIS, diaspora markets

10.3 Export Challenges & Opportunities

Challenges	US/EU sanctions (banking, shipping, insurance); pistachio aflatoxin concerns in EU; water crisis threatening pistachio/saffron production long-term; competition from USA/Turkey pistachios; inflation/currency instability

Opportunities	BRICS membership: new trade corridors with China, Russia, India; EAEU free trade agreement (2025); Iran–China 25-year strategic cooperation agreement; growing demand for organic saffron/pistachio; processed food exports to Iraq/Afghanistan/CIS

SECTION 11: COMMERCIAL & EMERGING TECHNOLOGIES

11.1 Digital & Precision Agriculture

Status	Limited due to sanctions restricting technology imports; but growing domestic capacity; Iranian Space Agency (ISA) satellites for crop monitoring; AREEO developing precision agriculture tools
Irrigation Tech	Soil moisture sensors and automated drip systems being piloted in Isfahan, Kerman; local companies developing IoT-based irrigation controllers
Drones	Domestic agricultural drone development; regulations evolving; used for crop scouting/spraying on limited scale; import sanctions constrain access

11.2 Biotechnology & Crop Improvement

GM Crop Status	Iran has NOT approved commercial GM crop cultivation. However, extensive GM research at universities (NIGEB, Royan Institute, ABRII). GM rice (Bt rice 'Tarom Molaii') was developed but not commercially released. GM cotton trials conducted. Iran imports GM soybean for feed.
Conventional Breeding	SPII (Seed and Plant Improvement Institute, Karaj) is primary breeding institution; released improved wheat, barley, rice, cotton varieties. AREEO coordinates agricultural R&D through ~60+ research institutes.
Tissue Culture	Used for date palm propagation; saffron corm multiplication; virus-free potato seed; orchid production

11.3 Protected Cultivation & Controlled Environment

Greenhouse Area	~13,000–15,000 ha (MAJ 2024, growing rapidly); among Middle East's largest greenhouse sectors
Key Regions	Kerman, Isfahan, Fars, Tehran, Hormozgan, Sistan-Baluchestan
Crops	Cucumbers (~40% of greenhouse area), tomatoes, bell peppers, strawberries, flowers (roses, carnations), herbs
Technology	Mostly simple plastic tunnel greenhouses; some glass/polycarbonate; evaporative cooling systems for hot regions; hydroponic/soilless systems in ~5–10% of new greenhouses
Water Saving	Greenhouses use 70–90% less water than open-field farming; critical advantage given Iran's water crisis

11.4 Iran-India Agricultural Technology Exchange

Innovation	Sector	Iran Strength	India Application	Impact
Saffron Cultivation	High-Value Crops	World's #1 producer (90% global); centuries of expertise; Khorasan	India's Kashmir saffron (J&K) – struggling with climate change/area decline	Variety exchange; post-harvest processing; quality standards
Qanat/Underground Irrigation	Water Management	37,000 qanats; 3,000-year engineering	India's arid Rajasthan/Gujarat;	Gravity-fed irrigation without energy;

Innovation	Sector	Iran Strength	India Application	Impact
		heritage; sustainable groundwater	traditional stepwell (vav/baoli) revival	groundwater sustainability; heritage
Pistachio Agronomy	Tree Crops	World's #1 producer; desert oasis cultivation; saline water tolerance	India's Rajasthan/Ladakh – pistachio trials beginning	Arid-land orchard management; saline irrigation techniques; post-harvest
Dryland Wheat	Crop Science	Rainfed wheat varieties for 200–400 mm rainfall zones (Zagros)	India's rainfed zones (MP, Rajasthan, Maharashtra)	Drought-tolerant varieties; conservation moisture techniques
Rainbow Trout Farming	Aquaculture	Top 5 global producer (~180,000–200,000 t); mountain cold-water culture	India's Himalayan states (J&K, HP, Uttarakhand, Sikkim)	High-altitude trout farming techniques; hatchery management
Date Palm Cultivation	Tree Crops	World's 2nd–3rd largest producer; Mazafati premium variety	India's Rajasthan, Gujarat, Kutch (date potential)	Variety introduction; tissue culture propagation; processing tech

SECTION 12: FOOD SECURITY & NUTRITION

12.1 Production Overview

Total Agricultural Output	~57.5 MT agricultural products/year (FAO Iran country brief)
Wheat (2024)	~14–15 MT (USDA/MAJ); govt procured 12 MT (+16% YoY); approaching self-sufficiency in good rainfall years; annual food requirement ~11.5 MT
Total Grain (2023)	21.1 MT (FAO GIEWS report); cereal stocks: 12.1 MT
Poultry Meat	~2.5–3.0 MT/year – self-sufficient; per capita ~30+ kg/year
Milk	~10–11 MT/year; growing dairy sector
Eggs	~1.0–1.1 MT/year – self-sufficient
Food Security Index	~96% (MAJ/SCI cited figure)

12.2 Food Security & Nutrition

National Status	Largely food-secure at national level for staples (wheat self-sufficiency in good years; chicken/eggs self-sufficient); but vulnerable to drought/sanctions for imports
Import Dependencies	Corn: ~9–10 MT (world's largest importers); soybean: ~2.1 MT; rice: ~0.8–1.5 MT; sugar: deficit; wheat: variable (0–5 MT depending on domestic harvest)
Sanctions Impact	Banking sanctions complicate food import payments; currency depreciation raises import costs; government subsidises basic food (bread, rice, cooking oil) through ration cards (smart subsidy system since 2010)
Bread Subsidy	Government subsidises flour for bread production; bread prices increased ~40% in some regions (2023–24) after subsidy reform; bread is Iran's most politically sensitive food
Nutrition Challenges	Double burden: overweight/obesity ~30-60% of adults (WHO); while ~5–8% face food access issues (rural/border areas); anaemia in women/children; shifting dietary patterns towards processed foods
Water–Food Nexus	Iran's #1 food security threat is WATER: 92% of water goes to agriculture; groundwater depletion means long-term production capacity at risk for pistachio, wheat, rice

SECTION 13: KNOWLEDGE EXCHANGE – BEST PRACTICES

13.1 What Iran Can Offer BRICS Nations

#	Achievement	Description
1	World's #1 Saffron Producer	~90% of global output; ~400–500 t/year; centuries of cultivation expertise; Khorasan provinces; world's most expensive spice
2	World's #1 Pistachio Producer	~550,000–600,000 t/year; 40%+ of global output; Kerman Province; desert oasis cultivation; export value ~$1.5–2B
3	Qanat System (UNESCO Heritage)	37,000 underground irrigation channels; 3,000+ years old; gravity-fed sustainable water management; model for arid-zone water
4	Rainbow Trout Farming	Top 5 globally: ~180,000–200,000 t/year; cold mountain streams; Chaharmahal-Bakhtiari, Lorestan
5	Dryland Farming in Extreme Aridity	Centuries of cultivation in <250 mm rainfall zones; wheat, barley, pistachio in harsh conditions
6	Date Palm Expertise	World's 2nd–3rd largest producer; premium varieties (Mazafati, Piarom); processing and export
7	Greenhouse Expansion Under Water Stress	~13,000–15,000 ha; 70–90% water savings; model for arid-country food production
8	Sturgeon/Caviar Heritage	Historic Caspian caviar leader; now pioneering farmed sturgeon; conservation breeding expertise

13.2 What Iran Can Learn from BRICS

#	Area	From	Opportunity
1	Rice Productivity	China, India	China's hybrid rice technology (>7 t/ha vs Iran's 3.5–4.5); India's SRI; could boost Iran's Caspian rice sector
2	Large-Scale Irrigation Modernisation	China, India	China's South-North Water Transfer; India's PMKSY; Iran's irrigation efficiency is only 35–40%
3	Soybean/Oilseed Production	Brazil	Brazil's 150+ MT soybean (vs Iran's near-zero); Iran imports >2 MT; could develop domestic soybean in Golestan/Khuzestan
4	Palm Oil Processing	Indonesia	Indonesia's world's #1 CPO; Iran is major vegetable oil importer; could develop downstream processing/refining
5	Dairy Cooperative Models	India	India's AMUL/NDDB model; Iran has growing dairy but fragmented smallholder base; cooperative aggregation needed
6	Agricultural Drones	China	China's 200,000+ drones; sanctions limit Iran's access; BRICS tech transfer could bridge gap
7	Beef Cattle Genetics	Brazil, South Africa	Brazil's Nelore; SA's feedlot models; Iran's beef sector deficit; could improve genetics and feedlot efficiency
8	GM Crop Policy	Brazil, India, China, South Africa	All 4 have decades of safe GM adoption; Iran has advanced research but no commercial approval; BRICS experience could inform policy

13.3 Agro-Climatic Matching – Iran-India

Iran Region	India State	Climate	Crops	Tech Transfer
Caspian Coast (Gilan/Mazandaran)	Kerala / Assam	Humid subtropical; rice + tea	Rice, tea, citrus, kiwi	Rice varieties; tea processing; aquaculture
Zagros Mountains (Kurdistan/Hamedan)	J&K / HP / Uttarakhand	Mountain continental; cold winter	Wheat, walnut, apple, cherry, livestock	Apple/walnut varieties; cold-climate dairy; trout farming
Central Plateau (Isfahan/Kerman)	Rajasthan / Gujarat	Arid; irrigated oases	Pistachio, saffron, wheat, dates	Drip irrigation; arid horticulture; qanat/stepwell models
Khuzestan (SW)	Punjab / Haryana	Hot semi-arid; irrigated plains	Wheat, sugarcane, rice, dates	Wheat mechanisation; sugarcane efficiency; canal management
SE Iran (Sistan-Bal.)	Rajasthan / Kutch	Hot arid; desert	Dates, sorghum, camel, fisheries	Dryland farming; date palm; livestock in extreme heat
NW Iran (Azerbaijan)	Kashmir / HP	Cold continental; mountain valleys	Wheat, barley, dairy, apples	Cold-tolerant dairy; apple varieties; organic farming

SECTION 14: REFERENCES & DATA SOURCES

14.1 Primary Data Sources

SCI	Statistical Centre of Iran (Markaz-e Amar-e Iran) – population, GDP, agricultural census. amar.org.ir
MAJ	Ministry of Agriculture Jihad – crop production, livestock, fisheries, extension, policy. maj.ir
CBI	Central Bank of Iran – GDP, inflation, trade data. cbi.ir
AREEO	Agricultural Research, Education and Extension Organisation – R&D coordination. areeo.ac.ir
SPII	Seed and Plant Improvement Institute (Karaj) – crop breeding, variety release
IFO	Iran Fisheries Organisation (Shilat) – fisheries/aquaculture statistics. shilat.com
IRIMO	Iran Meteorological Organisation – climate data. irimo.ir
FAO Iran	FAO Country Office – country brief, GIEWS alerts. fao.org/iran
FAO GIEWS	Global Information and Early Warning System – crop prospects. fao.org/giews
USDA-FAS	Foreign Agricultural Service – Grain & Feed, Oilseeds, Livestock reports (limited direct reporting due to sanctions; relies on open-source and industry). fas.usda.gov
IMF WEO	GDP, per capita (October 2025). imf.org/weo
World Bank	GDP, population, arable land. data.worldbank.org
UNDP HDR	Human Development Index. hdr.undp.org

14.2 Glossary

Term	Definition
MAJ	Ministry of Agriculture Jihad (Vezarat-e Jahad-e Keshavarzi) – Iran's agriculture ministry
SCI	Statistical Centre of Iran (Markaz-e Amar)
AREEO	Agricultural Research, Education and Extension Organisation
Qanat	Ancient underground irrigation channel using gravity to transport water from aquifer to surface; Iranian engineering heritage >3,000 years old; UNESCO Heritage
Kavir	Salt desert/salt flat; major feature of Central Iranian Plateau
GTC	Government Trading Corporation – handles strategic grain/oilseed imports
SPII	Seed and Plant Improvement Institute (Karaj) – Iran's primary crop breeding institute
IFO/Shilat	Iran Fisheries Organisation – manages fisheries, aquaculture, sturgeon conservation
Ostan	Province (administrative division); Iran has 31 provinces
ITMCO	Iran Tractor Manufacturing Company (Tabriz) – major tractor producer; MF 285/399