



MARKET RESEARCH



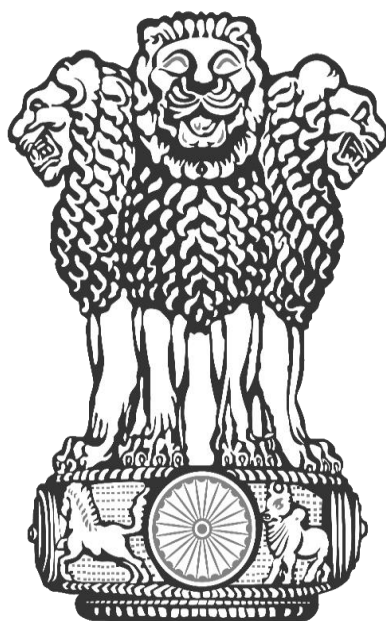
MACHINERY SECTOR 2026



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PART I

POLITICAL AND ECONOMIC SITUATION OF VENEZUELA



PART I

POLITICAL AND ECONOMIC SITUATION OF VENEZUELA

Geographic and Demographic Overview of Venezuela

Venezuela is located in the northernmost part of South America, bordering the Caribbean Sea to the north, the Cooperative Republic of Guyana and the Atlantic Ocean to the east, the Federative Republic of Brazil to the south, and the Republic of Colombia to the west. Its total area of 916,445 km² makes it the sixth largest country in Latin America ¹. The territory is administratively organized into 23 states, a Capital District, and Federal Dependencies, and is geographically articulated into five major natural regions: the Llanos region, the Andean region, the Coastal region, the Guayana region, and the Amazonian region.

In demographic terms, the National Survey of Living Conditions (Encuesta Nacional de Condiciones de Vida) produced by the Institute of Economic and Social Research of the Andrés Bello Catholic University (IIES-UCAB) estimates Venezuela's population at 29.37 million inhabitants for 2024², a figure that reflects the cumulative impact of sustained migratory outflows since 2015. The average population density is 30.8 inhabitants per km², although the distribution is markedly uneven: more than 75% of the population is concentrated in the northern coastal strip and in the country's central axis.

This extensive coastal strip, spanning more than 2,813 kilometers along the Caribbean Sea and 700 kilometers along the Atlantic Ocean, not only concentrates the majority of the population, but also grants the country a privileged geostrategic position as a gateway to Latin America. Its maritime location functions as a natural and direct channel linking the region to global markets in North America, Central America, the Caribbean, Europe, and Asia, while also facilitating access to the Panama Canal route.

Areas of Highest Population Concentration

The most populous states are Zulia (with its capital Maracaibo, the country's second most populated city), Miranda, Carabobo, Lara, and the Capital District (Caracas), which together concentrate approximately 55% of the national population³. The Caracas–Valencia–Maracay axis represents the country's highest-density industrial and services corridor. Venezuelan agricultural production also has a significant presence in this central strip, particularly regarding horticulture in the valleys of the coastal mountain range⁴.

This demographic and industrial concentration in the north-central and western regions of the country greatly facilitates commercial penetration, given the strategic proximity to the main maritime terminals. With the majority of consumers concentrated within very short distances of key infrastructure such as Puerto Cabello, La Guaira, and the port of Maracaibo, a logistical advantage

¹https://www.exteriores.gob.es/documentos/fichaspais/venezuela_ficha%20pais.pdf

²https://cdn.prod.website-files.com/5d14c6a5c4ad42a4e794d0f7/6803aeed2dfc5c19a4ac96cd_ENCOVI%202024_presentacio%CC%81n_integrada.pdf

³<https://www.proyectoencovi.com/encovi-2024>

⁴<https://www.fao.org/venezuela/venezuela/venezuela-en-una-mirada/es/>



is created that expedites distribution and direct supply of the domestic market. These terminals thereby function as direct gateways to the most populated areas, reducing transit times. In this context, port economics function as the main artery of the nation's commercial and fiscal activity. Although in recent decades this model gave rise to a deep dependence on consumer goods imports, port infrastructure remains the irreplaceable engine for Venezuelan exports.

Areas of Lowest Population Concentration

The states with the lowest population density are located in the south and southeast of the country. The states of Amazonas, Delta Amacuro, and Bolívar have the lowest relative density, despite together covering more than 35% of the national territory⁵. This low density is explained by tropical rainforest coverage, a scarcity of road infrastructure, and the remoteness from consumption centers, although these regions hold the country's largest natural resource reserves, particularly those near the Orinoco Mining Arc (AMO).

Primary Mining Areas

Venezuelan mining activity is fundamentally concentrated in the Orinoco Mining Arc (AMO), which covers an area of more than 113,598 km² in Bolívar state, equivalent to 12.4% of the national territory, where reserves of gold, diamonds, coltan, copper, iron, and bauxite are found, with the potential participation of 150 companies from 35 countries⁶.

Venezuela holds the world's largest proven oil reserves, with approximately 303 billion barrels according to data from the Organization of the Petroleum Exporting Countries (OPEC), a figure confirmed by multiple international organizations including the U.S. Energy Information Administration (EIA) and the BP Statistical Review⁷. The majority of these reserves are located in the Orinoco Oil Belt, situated across the states of Anzoátegui, Monagas, Guárico, and Apure, followed by reserves in the country's northwest in the states of Falcón and Zulia⁸.

Primary Agricultural Areas

Venezuelan agricultural production is concentrated in the west-central and plains regions. Its geographic location gives the country strong potential for tropical agriculture, enabling high yields in permanent crops such as coffee, cocoa, oil palm, and fruit trees, or semi-permanent crops such as sugarcane, plantain, and cassava⁹. Portuguesa state is the country's main agricultural hub: with approximately 800,000 hectares suitable for farming, it generates more than 50% of national maize production, 65% of rice, and 52% of sugarcane¹⁰.

The states of Barinas, Guárico, Cojedes, and Apure complete the plains axis of cereal and livestock production. In the Andean region, the states of Mérida, Táchira, and Trujillo concentrate

⁵ <https://www.proyectoencovi.com/encovi-2024>

⁶ https://www.sinembargo.mx/4746786/datos-tiene-petroleo-gas-oro-tierras-raras-venezuela-es-el-gran-pastel-para-eu/?_cf_chl_tk=NpjU6B6qRVeeIWXXKx6JqdmW8.tVq3mNM_7i3IsLyVg-1781282300-1.0.1.1-ij62Lt12LNRFLcleePlTUmuoJ8EmdWyY.iCRwKl.gU

⁷ <https://www.elimparcial.com/mundo/2025/12/01/venezuela-posee-303000-millones-de-barriles-de-petroleo-la-mayor-reserva-probada-del-mundo-confirmada-por-organismos-internacionales/>

⁸ <https://www.analitica.com/economia/pdvsa-reservas-probadas-de-petroleo-de-venezuela-superan-los-300-800-millones-de-barriles/>

⁹ <https://www.fao.org/venezuela/venezuela/venezuela-en-una-mirada/es/>

¹⁰ <https://fedegro.org/wp-content/uploads/2025/03/Resultados-2024-WEB.pdf>



production of vegetables, potatoes, and coffee, with family-based operations adapted to hillside topography. Zulia state, in its Sur del Lago de Maracaibo sub-region, is the country's leading producer of plantain and oil palm. The states of Aragua, Carabobo, and Yaracuy form the central agro-industrial axis, with production of sugarcane, maize, and vegetables¹¹.

Political-Economic Perspectives and Institutional Reforms

Currently, the country is in a political situation of instability and forced environmental changes—especially in the political and economic spheres. De facto power operates under the figure of Delcy Rodríguez as acting president following her swearing-in on January 5, acting parallel to the influence of the United States in the process. According to the announcement by the United States Secretary of State, Marco Rubio, the evolution of events for Venezuela is projected in three operational phases: stabilization, economic recovery, and transition¹².

In this process, there coexists internal tensions between the interim government—whose stabilization depends on the support of the armed forces and U.S. approval—and opposition forces backed by the international community, which demand greater clarity regarding the process termed "transition." Despite the resilience of the Venezuelan economy, where the adoption of digital payments, de facto dollarization, and the adoption of crypto assets by people have guaranteed momentary stability, the inflation projection estimated by the International Monetary Fund (IMF) remains high for 2026, posing a hyperinflation scenario of 628.8%¹³. This, of course, with variables subject to unpredictability—and with the possibility of changes favoring market dynamics that were not considered by the study.

Therefore, in accordance with on-site events, diagnoses made by national or multilateral organizations are conditioned by the decisions that are made daily within public branches of government. Namely, the positive socioeconomic reforms are already materializing, such as the partial reform of the Ley de Hidrocarburos (January 2026)¹⁴—which, fundamentally, allows for greater private participation—the approval of the Industrial Property and Socioeconomic Rights Laws, and the contemplation of future laws regarding administrative dynamization or electrical modernization¹⁵. This acts as a catalyst for the economy, and the effectiveness of the reforms and proposals—beyond their legislative approval—can modify the initial perspectives on the evolution of the Venezuelan economy for the coming years.

Preliminarily, the expectations and reception of the domestic and foreign markets have been positive. For example, the exchange rate gap decreased to 34.94%¹⁶ in early 2026, which is a significant improvement compared to the 90% recorded in December 2025¹⁷; this reduction acts as

¹¹ Ibid.

¹² <https://www.bbc.com/mundo/articles/cwywpdxxznzo>

¹³ <https://www.bloomberglia.com/latinoamerica/venezuela/fmi-proyecta-inflacion-de-682-en-venezuela-en-2026-ademas-de-contraccion-en-su-economia/>

¹⁴ <https://www.bbc.com/mundo/articles/cg7y4kznypno>

¹⁵ <https://www.asambleanacional.gob.ve/noticias/parlamento-aprueba-plan-basico-legislativo-2026-2027>

¹⁶ <https://www.bcv.org.ve/estadisticas/tipo-cambio-de-referencia-smc> <https://monitordolarve.com/precio-del-dolar-en-venezuela-hoy-tasa-bcv-y-monitor-27-de-febrero-de-2026/>

¹⁷ <https://bitacoraeconomica.com/economistas-brecha-cambiaria-muertesubasta-bcv/>

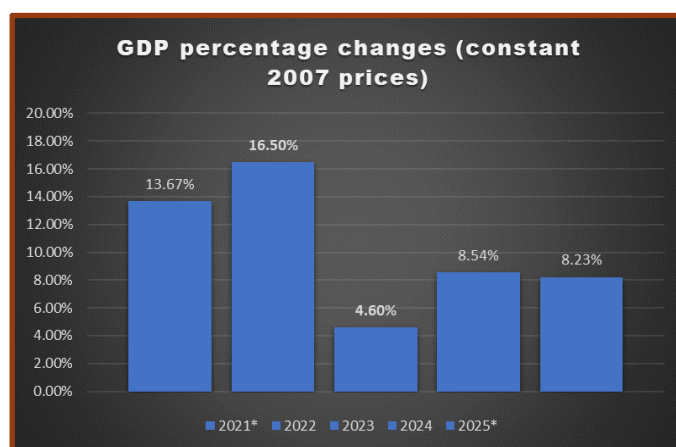
a natural stabilizer, as it slows down the implicit devaluation of purchasing power and grants greater predictability in price structure to producers and consumers, which is vital for projecting the demand for goods. Also, a 30%¹⁸ revaluation of the country's government bonds and those of PDVSA (the national company that monopolizes the hydrocarbon sector) was perceived, indicating that external anticipation of possible economic and institutional changes manifests favorably for the productive environment.

Within this framework, given the instability in the Middle East resulting from the conflict between Iran and the United States, Venezuela positions itself as a relevant actor in the international arena. This is because, in the short term, the increase in oil prices stimulates the demand for B2B services, corporate technology, and logistics, and improves general macroeconomic conditions, benefiting all sectors of the economy due to the interconnection between the economy and oil. However, in the long term—the one considered due to the unpredictability of the conflict's extension keeping prices high—Venezuela, as an energy provider for the United States and Europe, positions the country as an attractive hub for investments, which will possibly impact the country's productive environment, which boasts enormous potential.

Because Installed Capacity Utilization (ICU) is around 52%¹⁹, Venezuela's strategic relevance in the hydrocarbon sector can materialize into growth across various high-growth sectors, such as those previously mentioned, by taking advantage of this idle capacity. Despite the optimism, basic infrastructure—such as the electrical grid—and monetary and fiscal policies—legal reserve requirements and tax levels—need favorable reforms for the productive sector in order to achieve the aforementioned production possibilities.

Economic Growth and GDP Dynamics

According to data provided by Banco Central de Venezuela (BCV) from the second quarter of 2021 to the third quarter of 2025, the Venezuelan economy has shown pronounced variations in its economic growth, with high growth rates (16.50%) in 2021, while shows difficulties for its consolidation, with a sharp drop in 2023 and a gradual recovery in the subsequent years.



¹⁸ <https://www.bloomberglinea.com/mercados/bonos-de-venezuela-y-pdvs-suben-mas-de-30-en-la-semana-pero-hay-desafios-por-delante/>

¹⁹ <https://finanzasdigital.com/conindustria-capacidad-instalada-2025/>



Source: Own elaboration, based on data from Banco Central de Venezuela and the International Monetary Fund²⁰.

Now, in the following table, a comparison is made between Banco Central de Venezuela (BCV) and international multilateral organizations, comparing the percentage growth of the country's Gross Domestic Product (GDP). The most significant contrast is demonstrated in the data provided by the International Monetary Fund (IMF), which has projected notably lower percentages in 2024 and 2025 compared to those presented by the other organizations.

Percentage GDP growth			
Entity	2023	2024	2025*
BCV	4.6	8.54	8.23
ECLAC ²¹	3.2	8.5	6.5
UNDP ²²	4.7	8.5	5.8
IMF ²³	4	5.3	0.5

*2025 figures updated as of the end of the third quarter.

The growth currently observed in Venezuela, as a primarily oil-based economy, is attributed to the reactivation of the industry following its most critical years, spanning from 2014 to 2020: In contrast, for 2024, according to the Macroeconomic Performance Bulletin of Venezuela²⁴, oil activity generated at least 90% of foreign exchange, consolidating itself as the country's main source of income. Consequently, the rest of the non-oil productive sectors, which represent 89% of the economy and are considered a non-tradable sector, operate under an adverse efficiency and competitiveness environment. The correlation between these indicators and oil production is evident when considering the influence of oil production on macroeconomic indicators and, therefore, on all productive sectors of the country. Currently, oil production averaged 1,064

²⁰ Central Bank of Venezuela (2025). *Gross domestic product* Statistics. <https://www.bcv.org.ve/estadisticas/producto-interno-bruto>.
Central Bank of Venezuela. (2025, October 16). *The Venezuelan economy is advancing: GDP increased by 8.71% in the third quarter of 2025* Press Release. <https://www.bcv.org.ve/notas-de-prensa/la-economia-venezolana-avanza-el-pib-aumento-871-en-el-tercer-trimestre-de-2025>

Central Bank of Venezuela. (May 1, 2025). *The Venezuelan economy continues to advance: GDP grew 9.32% in the first quarter of 2025* Press Release. <https://www.bcv.org.ve/notas-de-prensa/la-economia-venezolana-continua-avanzando-el-pib-crecio-932-en-el-primer-trimestre>.

Central Bank of Venezuela. (2025, July 22). *The Venezuelan economy grew 6.65% in the second quarter of 2025* Press Release. <https://www.bcv.org.ve/notas-de-prensa/la-economia-venezolana-crecio-665-en-el-segundo-trimestre-de-2025>

International Monetary Fund. (s.f.). *Real GDP growth, Annual Percent Change*. Data folders. https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/VEN?zoom=VEN&highlight=VEN.

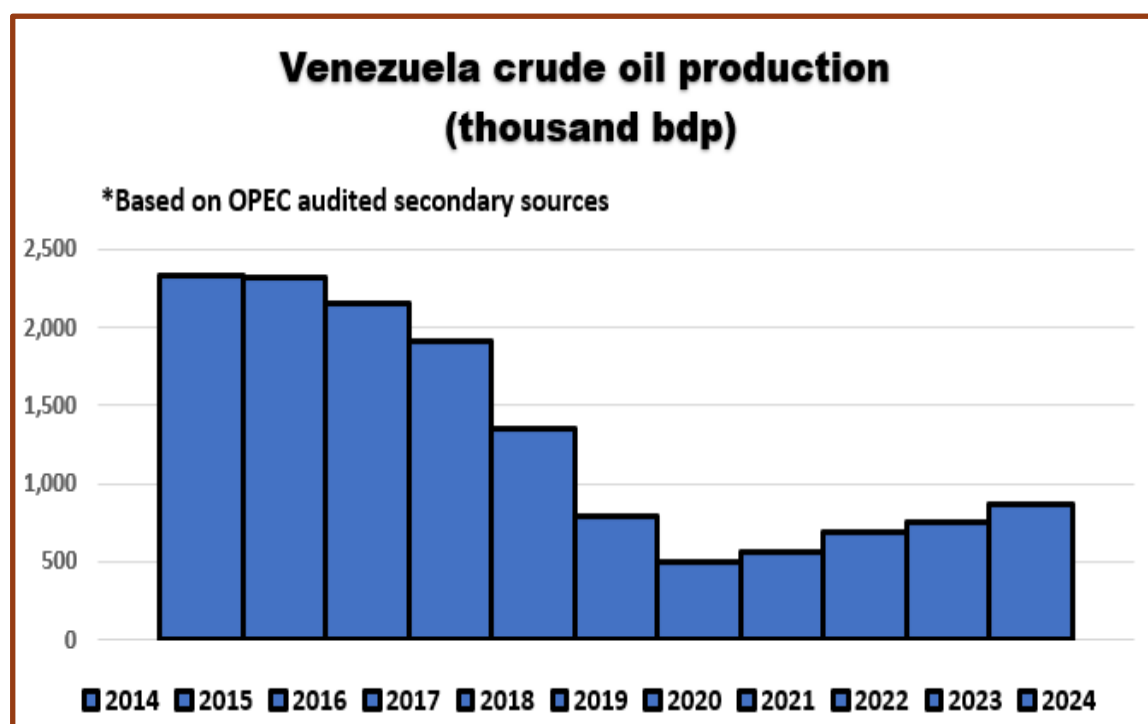
²¹ p129. <https://www.cepal.org/es/publicaciones/84460-balance-preliminar-economias-america-latina-caribe-2025>;
https://www.cepal.org/sites/default/files/pr/files/tabla_prensa_pib_estudioeconomico2023-esp.pdf
<https://www.mppf.gob.ve/venezuela-cierra-2023-con-un-crecimiento-economico-sostenido/>

²² <https://www.undp.org/es/venezuela/publicaciones/desempeno-macroeconomico-de-venezuela-tercer-trimestre-2025>

²³ <https://www.undp.org/es/venezuela/publicaciones/desempeno-macroeconomico-de-venezuela-tercer-trimestre-2025>,

²⁴ https://www.undp.org/sites/g/files/zskgke326/files/2025-04/boletin_pnud_4to_trimestre_digital.pdf

thousand barrels per day between January and December 2025, marking the country's best result since 2019 (UNDP, 2025)²⁵.



Source: Own elaboration based on OPEC annual reports (2014-2024)²⁶.

Likewise, the UNDP estimates that GDP growth in the third quarter of 2025 will reach 8.7%, driven primarily by the oil sector, which grew by +16.1%, and the non-oil sector, which recorded a +6.1% increase. According to BCV figures, although the recovery in non-oil activities such as construction (+16.40%), transport and storage (+9.35%), manufacturing (+8.98%), commerce, along with vehicle repair (+8.19%) and mining (+7.08%) have contributed positively to annual growth, significant challenges remain for their actual influence on the GDP.

Inflation and Purchasing Power

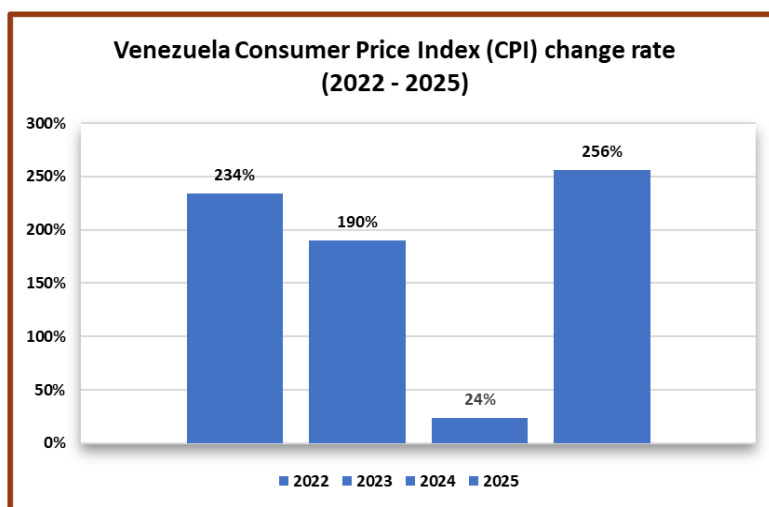
In particular, it is observed that these sectors operate in a context of high inflation, accelerated exchange rate depreciation, and a continuous loss of household purchasing power²⁷. These conditions limit the ability of the non-oil productive sector to contribute effectively given the progressively declining demand, fiscal or operational costly requirements, and limited access to credit. In that vein, inflation has remained around 250% for 2025. Reality that, given the expectations of economic reforms, the progressive increase in oil production, and the facilitation of

²⁵ https://www.undp.org/sites/g/files/zskgke326/files/2025-12/reporte_macroecomico_nov25_digital.pdf

²⁶ <https://www.opec.org/assets/assetdb/annual-report-2021.pdf> 2021 - 34,
<https://www.opec.org/assets/assetdb/annual-report-2022.pdf> 2022 - 33,
<https://www.opec.org/assets/assetdb/annual-report-2023.pdf> 2023 - 23,
<https://www.opec.org/assets/assetdb/annual-report-2024.pdf> 2024 - 23,
<https://www.opec.org/assets/assetdb/annual-report-2020.pdf> 2020 - 36,
<https://www.opec.org/assets/assetdb/annual-report-2019.pdf> 2019 - 36,
<https://www.opec.org/assets/assetdb/annual-report-2018.pdf> 2018 - 36-37.

²⁷ <https://www.bcv.org.ve/notas-de-prensa/la-economia-venezolana-avanza-el-pib-aumento-871-en-el-tercer-trimestre-de-2025> and
https://www.undp.org/sites/g/files/zskgke326/files/2025-12/reporte_macroecomico_nov25_digital.pdf

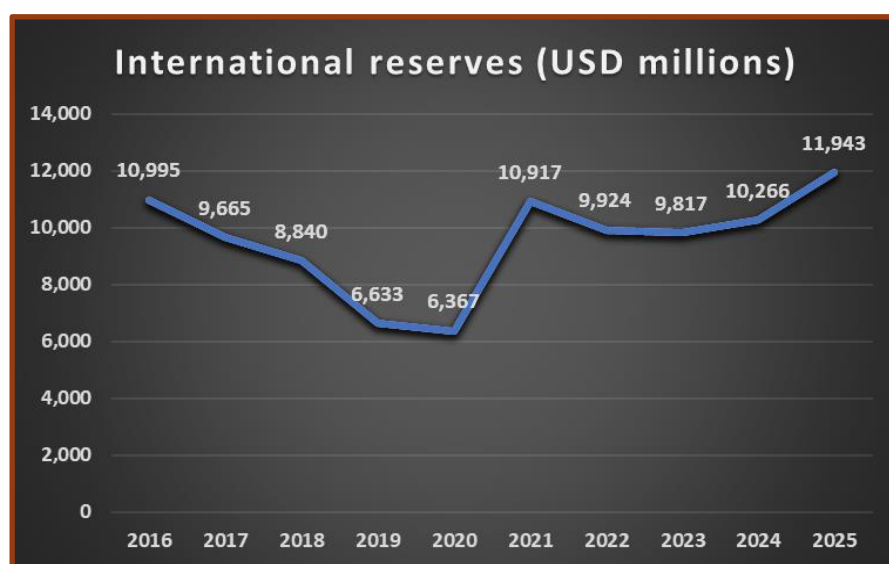
its export under the new political conditions, projects to the economy a scenario of moderate inflation.



Source: Own elaboration, data from ECLAC and UNDP.

International Reserves and External Debt

On the other hand, regarding international reserves, a gradual recovery is observed compared to the year 2020, Venezuela's lowest point in 45 years. The pressure created on the external balance has progressively diminished; however, the delayed pace of recovery denotes risks to macroeconomic sustainability in the face of rising external debt and a foreign exchange market constantly intervened by the State for exchange rate stabilization.

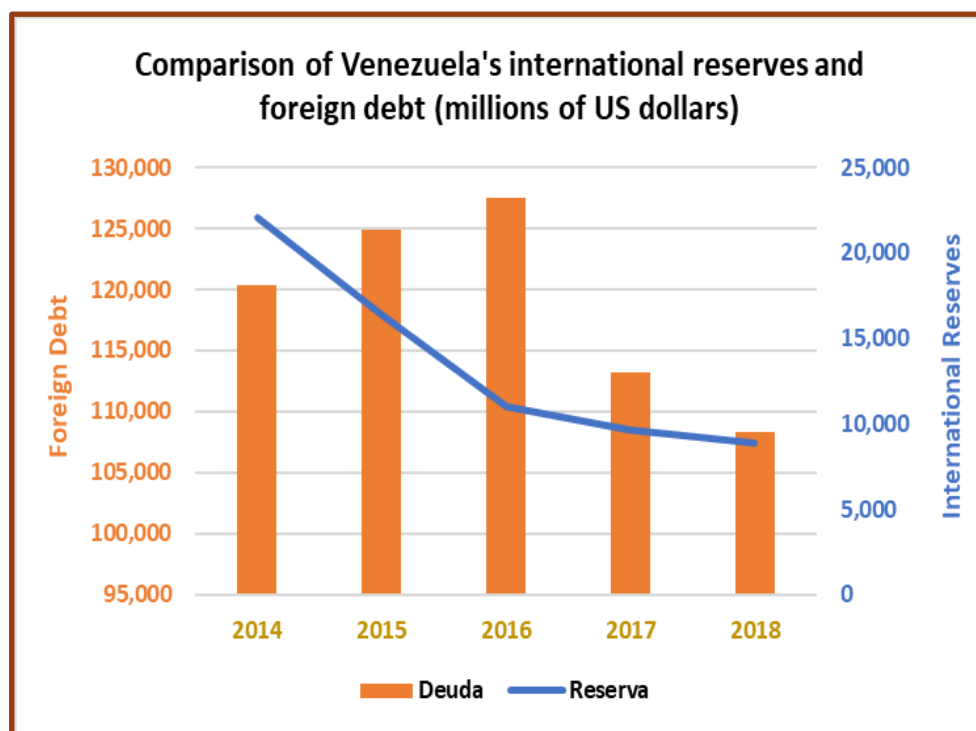


Source: Own elaboration, data from Banco Central de Venezuela²⁸.

Regard to the external debt—according to available data—, it has shown an upward trend, which contrasts negatively with the increase in the country's international reserves. It is estimated

²⁸ <https://www.bcv.org.ve/estadisticas/reservas-internacionales>

that, in recent years, the imbalance between debt and international reserves has damaged Venezuela's international investment position globally.



Source: Own elaboration, data from Banco Central de Venezuela²⁹.

International Reserves Trade Balance and Bilateral Relations

Venezuela's trade dynamics in recent years have resulted in a trade balance that depends on the volatility of hydrocarbon sector revenues and, consequently, on the international licenses permitted to Venezuela in this area. In 2024, the increase in oil production and the rise in external sales, especially from Chevron and Repsol, elevated the value of both total exports and total imports³⁰. In parallel, this increase, coupled with the inflow of remittances, has contributed to generating a positive balance in the current account.

Regarding income distribution, 53% originated in Asia, 22% in the United States, and the remainder was managed by independent operators³¹. On its part, Ecoanálítica points out that for 2024, oil-related GDP grew by 11.8%, while non-oil GDP increased by 3.8%.

Meanwhile, for 2025, non-oil exports have recently grown, positioning themselves between 66% and 87% compared to 2024, highlighting items such as rum, marine resources (shrimp, crabs), and other raw materials (such as coffee, fruits, wood chips, and cement)³². Overall, the sectors that

²⁹ <https://www.bcv.org.ve/estadisticas/reservas-internacionales> and <https://www.bcv.org.ve/estadisticas/deuda-externa>

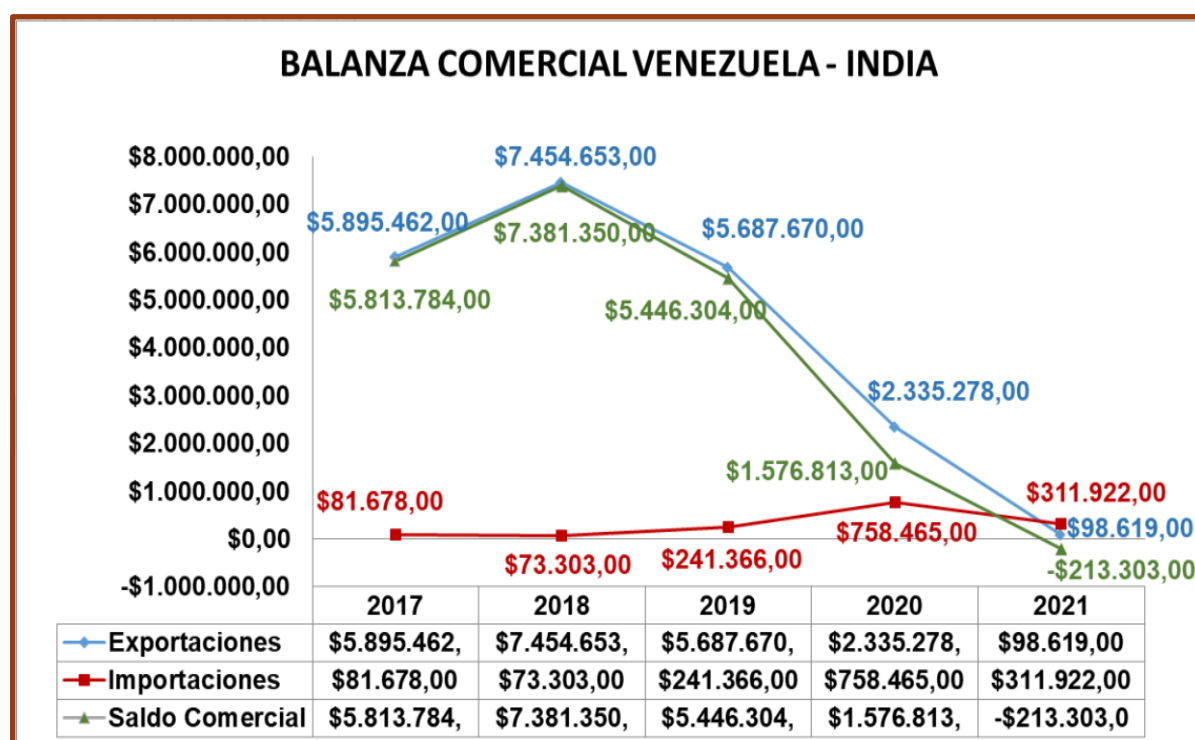
³⁰ <https://acading.org.ve/wp-content/uploads/2025/03/Balance-de-la-economia-venezolana-2024-y-perspectivas-2025.-Alejandro-Gutierrez.pdf>

³¹ <https://www.elnacional.com/2026/01/balance-del-comercio-exterior-venezolano-2025-y-perspectivas-2026/>

³² <https://www.elnacional.com/2026/01/balance-del-comercio-exterior-venezolano-2025-y-perspectivas-2026/>

saw a production increase that year were: oil, agriculture, food industry, pharmaceuticals, paper, auto parts, plastics and rubber, technology, and commerce³³.

In perspective, according to the Observatory of Economic Complexity³⁴, Venezuela exported approximately 3.69 billion dollars and imported 20.6 billion dollars in 2025 from India, resulting in a negative balance of 17 billion dollars for Venezuela. The main exports from Venezuela to India, by November 2025, were aluminum products, lead, and their derivatives; while the majority of imports were medicines, ceramics and related products, paper and its derivatives. The Banco de Comercio Exterior (BANCOEX) developed the following chart tracking the trade balance between both countries.



Source: Foreign Trade Bank (2023)³⁵.

³³ <https://www.elnacional.com/2026/01/balance-del-comercio-exterior-venezolano-2025-y-perspectivas-2026/>

³⁴ <https://oec.world/es/profile/bilateral-country/ven/partner/ind>

³⁵ <http://www.bancoex.gob.ve/wp-content/uploads/2024/02/Perfil-Pais-INDIA-2023.pdf>



PART II

EXCHANGE MARKET AND PAYMENT MANAGEMENT



PART II

EXCHANGE MARKET AND PAYMENT MANAGEMENT

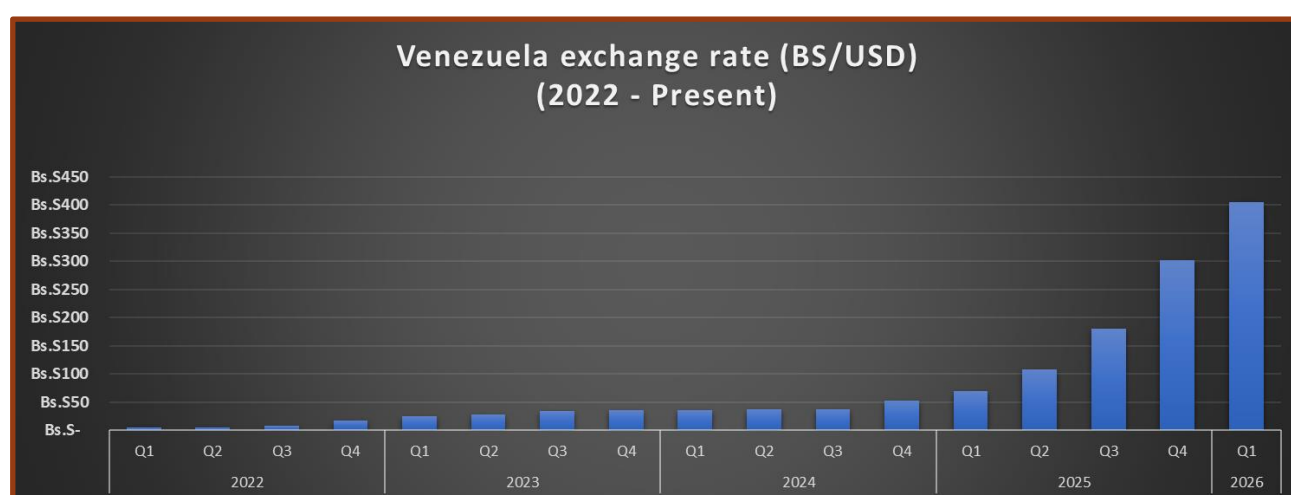
Characteristics of the exchange market in Venezuela

Historically, the Venezuelan exchange market has reflected the evolution of the country's balance of payments and a close connection with oil revenues³⁶. In this sense, the State has attempted to maintain a fixed exchange rate which, combined with an expansionary monetary policy, has generated capital flight and parallel markets.

The main characteristic of the exchange market has been an overvaluation of the "digital bolivar"³⁷ as it has transitioned through multiple exchange control systems (RECADI, OTAC, CADIVI, SITME, SICAD, CENCOEX), a characteristic that, coupled with the fall in oil revenues and the monetization of the fiscal deficit by the BCV, generated the hyperinflationary cycle that reached its peak in 2018. In the last five-year period (2021-2026), following the repeal of the Illicit Exchange Law (2018) and the entry into force of Exchange Agreement No. 1³⁸, the State allowed—in practice—the free convertibility of the currency and the circulation of the dollar; which generated a temporary price stabilization due to spontaneous transactional dollarization, breathing life into commerce and allowing the industry to set prices and trade in foreign currency.

Dynamics of the exchange rate gap and supply deficit

By 2023, the BCV adopted a progressive injection of cash dollars into the foreign exchange market to meet the demand for foreign currency and, as these stipulate the price of goods and services, contain inflation. In parallel, the Large Financial Transactions Tax (IGTF in spanish) was implemented for payments in foreign currency, in order to maintain the traceability of the bolivar and prevent total dollarization. However, starting in 2024³⁹, the real market demand for foreign currency exceeded the BCV's monetary injections.



³⁶ https://firodriguez.web.wesleyan.edu/docs/Books/Venezuela_Anatomy_of_a_Collapse.pdf

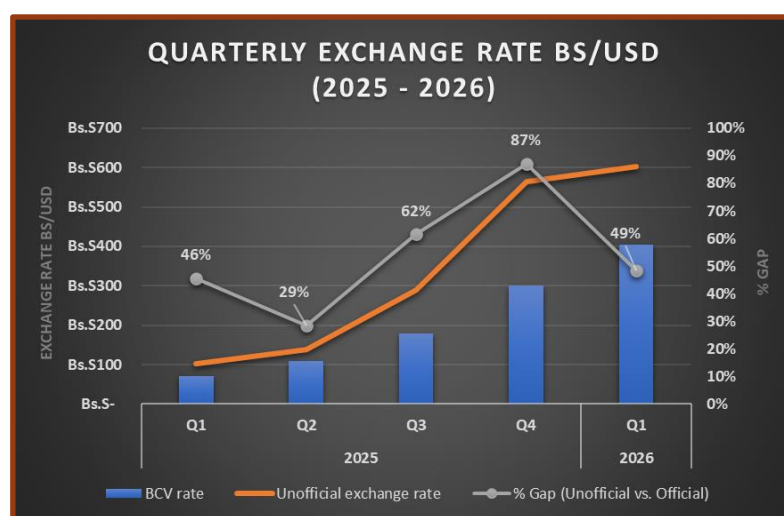
³⁷ Which, for the purposes of this report, we will refer to hereafter as "bolivar".

³⁸ https://petroleosdeamerica.com/VENEZUELA/ARCHIVOS/Gaceta_Oficial_07_09_18_num_Extra_6405.pdf

³⁹ <https://observatoriodefinanzas.com/>, dolarization index.

Source: Own elaboration, data from Banco Central de Venezuela.

Hence, after a gradual devaluation, when the unsatisfied demand for foreign currency exceeded its supply in 2025⁴⁰, the demand shifted to the unofficial market, which widened the exchange rate gap. The exchange rate gap—which, in other words, is the reflection of the foreign exchange supply deficit at the official rate—accelerates the currency devaluation by the Central Bank, in order to close the arbitrage window and optimize the State's fiscal cash flow, which allows reducing the necessary injection of foreign currency—mostly coming from international reserves—into the exchange market. This dynamic makes it possible to regularize the supply and demand of the foreign exchange market, restoring the price signals necessary for the proper functioning of the economy.



Source: Own elaboration, data from Banco Central de Venezuela and monitordolarve.com⁴¹.

Faced with this reality, the impact is negative on a domestic industry whose production is affected by imports (for the acquisition of raw materials and intermediate goods), as a result of the historical overvaluation of the bolivar and specialization in the hydrocarbon sector, which has increased production costs and makes goods less competitive. The exchange rate gap forces domestic producers who bill at the official rate to decapitalize. While their replacement costs—inputs, spare parts and raw materials, and risk coverage—are implicitly priced at the parallel dollar given the shortage of foreign currency in the official exchange market, their profits are accounted for in bolivars. This situation, according to the economic sector and inflation, worsens in accordance with the business production cycle. The initial real value of the bolivar compared to the real value of the bolivar collected at the end of the cycle is lower than what is necessary to cover replacement costs.

Therefore, the merchant is faced with limited options. If they adjust their prices in bolivars to cover the replacement cost, the nominal price at the official rate skyrockets, exposing them to national regulations or forcing them out of the market. In addition, economic agents, aware of the

⁴⁰ <https://www.bcv.org.ve/estadisticas/balance-general-al-31012026>, <https://www.ucab.edu.ve/investigacion/centros-e-institutos-de-investigacion/iies/informes-de-coyuntura/>

⁴¹ https://monitordolarve.com/?fbclid=PAVERFWAQP9z9leHRuA2FlbQIxMABzcnRjBmFwcF9pZA8xMjQwMjQ1NzQyODcoMTQAAad3feHLCsM8GwzY4frZP6gnd9kmbFkTDKJVH-J8pfGf7g4GBrBlOYE-f3CU7Q_aem_jigX3PRnbjBPUz9FLJUXnw



exchange disparity, are encouraged to make purchases in bolivars as a form of market arbitrage, limiting the access to foreign currency by businesses. Coupled with this, when taxes are paid in bolivars on accounting profits that do not reflect economic reality, accounting books generate nominal profits that force the entrepreneur to pay proportionally high taxes (with respect to their real profit), which contributes to the decapitalization of businesses.

Thus, its impact is reflected both in economic terms (decapitalization) and in operational or transactional costs. Companies have to manage a bi-monetary ecosystem, that is, bolivars in national accounts, cash dollars, and dollars in foreign accounts or digital wallets, each with a different value and liquidity in order to reduce the costs generated by the exchange rate differential; along with the administrative cost of reconciling this reality.

Challenges for international capital and repatriation of dividends

However, for international capital, the exchange rate gap raises the country's risk premium regarding the repatriation of dividends. Finding a limited supply of foreign currency, or competing against a large demand for it in the domestic market, earning profits in bolivars limits its convertibility into foreign currency for repatriation due to market illiquidity. Also, companies are exposed to legal compliance risks and the operational difficulties of valuing their assets. Using the official rate would artificially overvalue assets, while using parallel valuation contravenes the accounting regulations of the country of origin⁴², thus complicating the financial statements of transnational companies.

In accordance with the above, the complicated situation of the exchange rate market, characterized by the exchange difference and the lack of capital (due to operational decapitalization), forces economic actors to diversify traditional banking options in search of new forms of settlement. The difficulty of accessing foreign currency in the official market, coupled with the need to safeguard the value of productive operations, drives companies towards more flexible payment management. In this context, the financial structure of businesses ceases to be just an accounting aspect and becomes a strategy, using tools that allow them to overcome both the lack of local liquidity and the isolation from the international banking system.

Understanding the scenario of uncertainty in recent years, carrying out international transactions has become an exercise in financial complexity. This is mainly due to Venezuela's disconnection from the "global network" regarding the payment system with respect to the economic order, backed by the Western Hemisphere and adopted by the rest of the world, where Venezuela is isolated from the SWIFT system, embodying in its image the phenomenon of over-compliance for foreign investors. In this regard, there is a real impact of the restrictions on the BCV and public banking, which turns private banking into the only (and narrow) bridge to the SWIFT system. Nevertheless, despite the existence of this link, international banks fear indirect sanctions from contact with Venezuelan banks, resulting in even transactions to non-sanctioned companies being rejected, subject to meticulous review, or to internal consideration due to the degree of risk exposure.

⁴² https://petroleosdeamerica.com/VENEZUELA/ARCHIVOS/Gaceta_Oficial_07_09_18_num_Extra_6405.pdf

It is in this context where there are increases in banking transaction costs, and waiting times affect not only the exchange itself, but also subject organizations to presenting rigorous reports and documents justifying the origin and destination of each movement to ensure transaction transparency. This forces banking entities to work in bureaucratic structures parallel to the global banking network, while having to adhere to its rules and considerations.

However, the private sector has developed mechanisms to ensure operability despite the barriers. In this regard, one of the considered solutions refers to payment triangulation where, through "payment service providers (PSPs)" and accounts in jurisdictions such as Panama, the U.S. or Europe, cash flow has been mobilized outside Venezuelan jurisdiction⁴³. Domestically, the country has moved towards digitalization, achieving 98% digital transactions through tools such as: mobile payment (P2P/C2P), bank transfers (VES), biopago, and foreign currency custody accounts that act as an operational value refuge. Some of these allow companies to manage dollars within the national system, although their mobility abroad is restricted, enabling a certain normalization in economic flow and value safeguarding.



Source Rayl  Luj n in Bloomberg L nea (2023), based on information from Ecoanal tica⁴⁴.

In Venezuela, the integration of crypto assets and stablecoins such as USDT or USDC has been demonstrated as a tool for economic survival in the face of distortions in the local financial system. This practice allows small and medium-sized companies to expedite their international B2B payments, achieving an immediacy given the constant need for market revaluation. It is a model that strictly responds to an operational need within an environment with limited access to global banking, a situation that we hope will become less of an issue as we move forward with our phased implementation following the current circumstances.

This ecosystem operates under the supervision of SUNACRIP, which defines these assets as intangible personal property, but their use entails significant tax challenges that limit their appeal

⁴³ <https://publications.iadb.org/publications/spanish/document/Fintech-en-America-Latina-y-el-Caribe-un-ecosistema-consolidado-con-potencial-para-aportar-a-la-inclusion-fianciera-regional.pdf>

⁴⁴ <https://www.bloomberglinea.com/2023/06/09/en-venezuela-circulan-us4825-millones-en-efectivo-mientras-aumentan-transacciones-en-divisas/>



as a simple savings alternative. Operations are subject to a robust tax burden that includes additional VAT rates, ranging between 5% and 25%, in addition to the application of the Large Financial Transactions Tax (IGTF), which considerably raises the costs of each movement. Consequently, the Venezuelan model does not present itself as a deregulated route, but as a complex accounting management structure. Companies are forced to balance their cash flows between bolivars, foreign currency, and crypto assets, facing an environment where transactional agility is counterbalanced by strict and costly state tax control. This reality reflects that adoption in the country is a technical response to systemic problems and not a frictionless preference.

Future expectations: towards a return to the financial system

In that perspective, the resolution of these obstacles does not depend solely on technical tools, but on the recovery of trust in institutions, as well as the flexibilization of international sanctions, whose status is on hold following the ongoing economic rearrangement. At present, although a possible reintegration of Banco Central de Venezuela (BCV) into the global system is being discussed, the changing reality and the existing dependence on foreign exchange flow must be taken into account. Meanwhile, as the formal supply of foreign currency stabilizes and cost dispersion is reduced, companies will continue to operate under a traditional hybrid system, influenced by international digital wallets and digital asset exchange, configuring a payment management system with logistical challenges, adaptable solutions, and a uniqueness in replicability worldwide.

As events that contribute to macroeconomic stability occur, such as the decrease in the exchange rate gap—which has decreased by up to 60% in two months—, oil revenues increase due to the world's geopolitical reality, and the gradual insertion of Venezuela into the international financial system without restrictions takes place; the productive apparatus will be boosted. Furthermore, since the population's adoption of different payment methods has taken place, companies will face a favorable scenario to diversify their collection channels and prioritize those methods that optimize their profitability.



PART III

GENERAL AGRICULTURAL CONTEXT



PART III

MACHINERY SECTOR

The global agricultural machinery sector is found undergoing a significant structural transformation, marked by an unprecedented displacement of the manufacturing centers. Its domain is being transferred from traditional western centers towards the Asia-Pacific region. This transition is increasingly necessary. further to simple cost arbitrage and, to a greater extent, to India's exceptional capabilities in "frugal engineering" and in conjunction with high-volume manufacturing. By 2024, it is expected that the global market for agricultural tractors will experience significant growth, going from \$81.6 billion at a projected valuation of \$151.7 billion by 2034. This represents a Compound Annual Growth Rate (CAGR) of 6.4% over that period⁴⁵. Within this global context, the broader market for agriculture and agricultural machinery is expected to exceed \$329.02 billion by 2034⁴⁶. A crucial element of this expansion is the Indian agricultural machinery industry, which has evolved from an import-dependent sector in the 1940s to become the world's largest producer and consumer of tractors, selling approximately 10 lakh (approximately US\$10,000 by 2026) units annually from 2025 onwards⁴⁷.

STRUCTURAL DISPLACEMENT GLOBAL AGRICULTURAL MACHINERY SECTOR Transition 1940–2034 · Western centers → Asia-Pacific · India as epicenter			
\$81.6B → \$151.7B Tractor market 2024– 2034	CAGR 6.4% Compound Annual Growth Rate	10 lakh/year India tractors 2025+ (~1 M units)	\$329B+ Total agri-machinery market 2034
TRADITIONAL WESTERN CENTERS High complexity · High cost · Historical dominance 1940–2000			
Main brands ▪ USA · John Deere · AGCO · CNH Industrial. ▪ Germany · CLAAS · FENDT · Deutz-Fahr. ▪ Italy Same Lamborghini Tractors. ▪ UK · JCB · Marshall.		Characteristics ▶ High complexity and cost engineering. ▶ High purchasing power markets. ▶ Lower volumes · high margins. ▶ High dependence on specialized labor.	



▼ STRUCTURAL DISPLACEMENT ▼ Beyond cost arbitrage — unique capabilities in frugal engineering and high-volume manufacturing
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⁴⁵ <https://market.us/report/global-agricultural-tractor-market/>

⁴⁶ <https://www.precedenceresearch.com/agricultural-and-farm-machinery-market>

⁴⁷ <https://es.scribd.com/doc/51528520/Tractor-History>

**ASIA-PACIFIC REGION · INDIA**

The world's largest producer and consumer of tractors · New global epicenter

PILLAR 1**Frugal Engineering**

- Design for extreme environments.
- Max functionality · min cost.
- Adaptation to emerging markets.
- Durability over sophistication.
- Field maintenance possible.

PILLARS 2**High-volume Manufacturing**

- 10 lakh (~1 M) units/year.
- Unique economies of scale.
- Integrated supply chain.
- Largest global producer.
- Competitive unit costs.

PILLAR 3**Massive Domestic Market**

- Domestic base: 10 lakh/year.
- Structural rural demand
- Export platform.
- State subsidies to the sector.
- 1940s importer → world leader.

Mahindra · TAFE · Sonalika · Escorts · John Deere India · Force Motors**MARKET NOTE · 2034 PROJECTION****6.4% CAGR**

Compound Annual Growth Rate 2024–2034 · Global Tractor Market

\$151.7B tractor valuation 2034- \$329B+ agricultural machinery market total

India 2025+: ~10 lakh units/year · reference price ~\$10,000 USD/unit

TIMELINE · INDIA'S EVOLUTION 1940–2034

1940s	Dependent importer
1960–80s	First local plants
1990–2000s	National industrial scale
2010–2015	Regional leadership Asia
2025+	10 lakh units/year · global leadership
2034	Target \$151.7B · CAGR 6.4%

**STRATEGIC OPPORTUNITY · INDIA → VENEZUELA****Advantages for Venezuela**

- ▶ Tractors 40–60% cheaper than Western ones
- ▶ Frugal engineering adaptable to Venezuelan soils
- ▶ Permanent stock: base of 10 lakh units/year
- ▶ Indian Embassy active in Caracas

Aligned capabilities

- ▶ Resistant design for tropical climate and difficult terrains
- ▶ Experience in similar emerging markets
- ▶ Scale → accessible bilateral financing
- ▶ Potential JV with local agricultural companies

Source: Own elaboration, 2026.

Global agricultural machinery market

It should be understood that, in principle, global interest in agricultural mechanization is deeply connected with demographic demands and the need to ensure food security. Given the projection that the world population will reach 9.7 billion projected for 2050, the need to increase agricultural productivity has moved beyond simply expanding farmland, now focusing on intensifying existing farming operations⁴⁸. This has led to a massive increase in demand for machinery. This increase is especially noticeable in areas characterized by high population density and the prevalence of smallholdings. In 2024, the Asia-Pacific region positioned itself as the main player in the global market, with a share exceeding 48.20%, representing revenues of 39.3 billion dollars⁴⁹.

The acceleration of global market growth is largely due to the adoption of precision agriculture and automation. Currently, the integration of technologies such as the Internet of Things, Artificial Intelligence (AI) and GPS equipment is not exclusive to large Western agricultural operations⁵⁰. Increasingly, emerging markets are adopting these technologies. They do this to mitigate both the increase in labor costs and the migration patterns from rural to urban areas. These patterns have generated a critical labor shortage in numerous farming communities⁵¹, although they have optimized agricultural production over time.

Venezuelan Machinery Market: Structure of Domestic Demand

Venezuela has a trade structure highly dependent on imports of capital goods, among which machinery plays a central role. Capital goods represented 30.30% of the country's total imports, valued at US\$13.621 billion⁵², while Venezuela exported only US\$0.174 billion in this category, highlighting a structural deficit in the local production and supply of machinery and equipment. This

⁴⁸ <https://dataintelo.com/report/agricultural-machinery-market>

⁴⁹ <https://market.us/report/global-agricultural-tractor-market/>

⁵⁰ <https://www.precedenceresearch.com/agricultural-and-farm-machinery-market>

⁵¹ <https://www.mordorintelligence.com/industry-reports/india-agricultural-machinery-market>

⁵² <https://wits.worldbank.org/countrysnapshot/es/VEN/textview>



asymmetry is not temporary, but rather the reflection of decades of specialization in hydrocarbons and disinvestment in the productive sector.

In terms of the current industrial position, the president of Conindustria revealed that the capacity utilization of Venezuelan industry reached 47.8% at the end of 2024, exceeding the figure recorded in 2023 by four percentage points, with industrial productivity growth of 16.8% that year. However, this partial recovery coexists with a structural technological deficit: the national fleet of machinery —both agricultural and industrial— has exceeded its useful life, creating a need for massive renewal that transcends specific sectors⁵³.

Analysis of segments of the market of machinery

Analysis of demand in the machinery sector indicates a marked inclination towards equipment that offers versatility and the ability to perform multiple functions. Tractors continue to be the fundamental and predominant equipment. Their importance lies in the essential functions they perform: tilling, sowing, and transport⁵⁴. However, the irrigation machinery sector is emerging as the fastest growing. This is due, especially in areas at risk of drought, to the strong government support that micro-irrigation systems and solar-powered pumps are receiving⁵⁵.

Regarding market power, the market is segmented according to the size of the farm. Machinery with more than 100 HP is preferred in large operations in North America and Europe. Conversely, the growing small farmer segments in Asia and Latin America are driving demand for equipment with a power range of 30 to 100 HP⁵⁶. Indian manufacturers have historically dominated the sub-50 HP segment, but recent trends show a move towards the 51-80 HP category, which is projected to grow at a CAGR of 9.3% as farmers shift to multi-crop rotations with higher torque intensity⁵⁷.

COMPARATIVE CHART · PARTICIPATION BY POWER SEGMENT AND REGION

POWER SEGMENT ANALYSIS GLOBAL AGRICULTURAL MACHINERY MARKET Regional distribution by HP · Segment leaders · Projected CAGR			
■ >100 HP High power	★ 51–80 HP CAGR 9.3%	■ 30–50 HP Sub-80 HP	◆ India: leader sub-80 HP

⁵³ <https://observatorio.gob.ve/venezuela-proyecta-crecimiento-industrial-de-11-en-2025/>

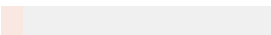
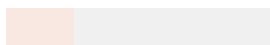
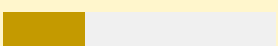
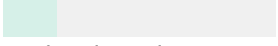
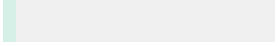
⁵⁴ <https://dataintelo.com/report/agricultural-machinery-market>

⁵⁵ <https://www.mordorintelligence.com/industry-reports/india-agricultural-machinery-market>

⁵⁶ <https://dataintelo.com/report/agricultural-machinery-market>

⁵⁷ <https://www.mordorintelligence.com/industry-reports/india-agricultural-tractor-market>



SEGMENT	North America / Europe	Asia (India / China)	Latin America	Leading manufacturers
>100 HP High power Large-scale operations	90% Total domain  Large-scale mining	15% Minimum presence  Emerging segment	25% Limited use  Agroindustry	John Deere deer CNH Industrial USA/IT AGCO / FENDT DE/USA CLAAS Germany
81–100 HP High-medium power Segment transition	55% Secondary market  Medium farms	35% Slow growth  Expanding	40% Moderate market  Commercial agriculture	Mahindra India New Holland USA/IT Kubota Japan Deutz- Fahr Germany
51–80 HP ★ CAGR 9.3% Greater global growth Multi-crop rotation	30% Secondary market  Small farms	75% Demand driver  Emerging farmer	70% High traction  Small-medium producer	◆ INDIA LEADS HOW Chennai Sonalika Punjab Escorts Haryana Mahindra Mumbai Force Motors Pune
30–50 HP Low power Historical dominance India	20% Marginal use  Orchards and nurseries	80% Main market  Small farmer	60% Solid demand  Tropical crops	Mahindra ◆ India HOW ◆ India Kubota Japan Yanmar Japan
<30 HP Micromechanization Slope · vegetables	5% Niche  Specialized orchards	70% Massive  Paddy rice · side	45% Significant  Andes · coffee · cocoa	Kubota Japan Yanmar Japan Mahindra ◆ India Force Motors ◆ India

★ 51–80 HP SEGMENT · THE ONE WITH THE HIGHEST GLOBAL GROWTH ★

Projected CAGR: 9.3% · Driven by multi-crop rotation and increased torque intensity in Asia and Latin America

Indian manufacturers (TAFE, Sonalika, Escorts, Mahindra) are leading the transition from sub-50 HP into this segment



SUBSECTORS OF MACHINERY · GROWTH DYNAMICS

Tractors · Fundamental equipment	Irrigation machinery · Fastest growing segment
▶ Functions: tillage · planting · transport ▶ Predominant equipment in all markets ▶ High versatility and multi-functionality as a driver ▶ Segment with the largest volume of units	▶ Micro-irrigation and solar pumps: governmental support ▶ Drought-risk zones: structural demand ▶ India leads the transition towards precision irrigation ▶ Venezuela: direct opportunity in substitution

Source: Own elaboration, 2026.

The Indian manufacturing ecosystem

India's global leadership position in tractor production has been achieved thanks to sustained political support over decades and the unique structure of its domestic market. The industry, valued at \$17.53 billion in 2024, will reach \$40.37 billion by 2034⁵⁸. This growth is based on a highly concentrated competitive landscape where five major companies — Mahindra & Mahindra, TAFE, Escorts Kubota, Sonalika (International Tractors Limited) and John Deere— together they have more than 81% of the market share⁵⁹.

Competitive landscape of Indian tractor manufacturers

The Indian market is characterized by several structural nuances that influence its export competitiveness. First, the rise in small farms (often smaller than 1 hectare) has necessitated the development of compact yet powerful tractors. Second, the preference for two-wheel drive (2WD) models, which currently account for 74.3% of sales, has allowed manufacturers to keep initial purchase costs low⁶⁰. However, four-wheel drive (4WD) units currently represent the fastest growing segment. Its progress is occurring at a compound annual growth rate (CAGR) of 11.1%, driven by the expansion of agricultural mechanization into more challenging terrains and specific tasks, such as waterlogging in rice cultivation⁶¹.

SUPPLY CHAIN · INDIA → VENEZUELA

Circular flow diagram · Agricultural machinery

Indian Manufacturers · VENEQUIRCA Node · Venezuelan Producer · Logistics Challenges

⁵⁸ <https://www.researchandmarkets.com/reports/6112217/india-agricultural-machinery-market-size-share>

⁵⁹ <https://www.mordorintelligence.com/industry-reports/india-agricultural-machinery-market>

⁶⁰ <https://market.us/report/global-agricultural-tractor-market/>

⁶¹ <https://www.mordorintelligence.com/industry-reports/india-agricultural-tractor-market>



NODE 1 · INDIA MANUFACTURERS · TOP 5 World's largest tractor producer · 10 lakh units/year				
Mahindra 22% market share 25–75 HP Global leader · 4WD	HOW 15% market share 30–75 HP Massey Ferguson JV	Sonalika 14% market share 35–90 HP Largest exporter	Escorts 11% market share 25–80 HP Kubota partnership	Force 8% market share 14–50 HP Compact hillside
2WD: 74.3% of current sales (low initial cost) 4WD: CAGR 11.1% (highest growth segment · difficult terrain)				

▼ Machinery flow · Technical documentation · Original spare parts	Purchase orders · Market feedback · Field reports ▲
NODE 2 · VENEQUIRCA Strategic distributor · Bilateral intermediary India–Venezuela	
MAIN FUNCTIONS ① Technical Support ▶ On-site after-sales assistance ▶ Training for Venezuelan operators ▶ Remote and on-site diagnostics ② Spare Parts Inventory ▶ Strategic stock of critical parts ▶ Automatic replenishment agreement ▶ Guaranteed delivery time ③ Distribution and Logistics ▶ Coordination of Venezuelan ports ▶ COMEX management and documentation ▶ Delivery to the final producer	KEY INDICATORS < 48 h Support response time 90 days Minimum stock of spare parts 15+ SKU Available models 7 states Regional coverage Spanish Support language Diplomatic role ▶ Coordination with Indian Embassy ▶ Facilitator of bilateral agreements

▼ Machinery delivery · Training · Spare parts · Technical service		Operational feedback · Failure reports · Accessory demand ▲	
NODE 3 · VENEZUELAN PRODUCER · END USER Small and medium farmer · National agricultural axis			
Target regions	Machinery Needs	Benefits received	



▶ Plains: Guárico · Portuguesa ▶ Western axis: Barinas · Cojedes ▶ Andes: Mérida · Táchira ▶ South of the Lake · Zulia	▶ 51–80 HP: multi-crop rotation ▶ 30–50 HP: small plot ▶ Crawler tractors: Andes and South of the Lake (Sur del Lago) ▶ Power tillers: hillsides < 30 HP	▶ 40–60% lower cost than the West ▶ Guaranteed local technical support ▶ Spare parts available in Venezuela ▶ Accessible bilateral financing
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↻ OPERATIONAL FEEDBACK LOOP ↻

The Venezuelan producer's field feedback feeds product development in India via VENEQUIRCA

⚠ LOGISTICAL CHALLENGES OF THE CHAIN

Critical risk factors in the India–Venezuela bilateral operation

① International Payments ▶ Restrictions on access to foreign currency in Venezuela ▶ Alternative mechanisms: barter / crypto-assets ▶ Letters of credit: slow and costly process ▶ Exchange rate risk in long operations ▶ Single Window as a possible facilitator	② Tariffs and Legal Framework ▶ COMEX Regime · Decree 5.105 (2025) ▶ Health Registration Certificate: 45–90 days ▶ Machinery import tariff: variable ▶ Anti-Blockade Law as a facilitating framework ▶ Administrative silence: risk of blockage	③ Spare Parts Guarantee ▶ India–Venezuela Distance: ~16,000 km ▶ Transit times: 30–45 days by sea ▶ Standardization of parts across brands ▶ Local warehouse: critical initial investment ▶ Manufacturer's warranty vs. local warranty
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CONTEXT OF THE INDIAN COMPETITIVE LANDSCAPE

Indian Market · Structural Context ▶ 74.3% of sales: 2WD models (low initial cost) ▶ 4WD: CAGR 11.1% (difficult terrain · rice) ▶ Farms < 1 ha: compact tractor driver ▶ State subsidy policies: sustained demand	Concrete opportunity · Venezuela ▶ Obsolete Park: immediate need for renewal ▶ Agricultural GDP +8.6% · active investment window ▶ 51–80 HP segment: most relevant CAGR 9.3% ▶ VENEQUIRCA as preferred local partner
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Source: Own elaboration, 2026



Global Overview and Opportunities in Construction, Mining, and Industrial Machinery

The analysis of the machinery sector in Venezuela cannot be limited exclusively to the agricultural sphere. The profound interconnection between the country's economic recovery cycle, the reactivation of its oil industry, the boost to formal mining, and the urgent need for infrastructure modernization makes it essential to consider other strategic subsectors within the machinery ecosystem: construction and infrastructure machinery, mining machinery, industrial and manufacturing equipment, and electrical and energy equipment. In each of these segments, India has developed significant export capacity that complements its already documented leadership in agricultural machinery.

Construction and Infrastructure Machinery

- **Global market.**

The global construction equipment market was valued at approximately \$154.26 billion in 2024, with projected growth at a compound annual growth rate (CAGR) of over 3.6%, reaching an estimated revenue of \$244.3 billion by 2037. This growth is primarily driven by infrastructure demand in emerging economies, accelerated urbanization, and the adoption of technologies such as telematics and automation in earthmoving machinery⁶².

Within the global market, over 60% of demand comes from infrastructure projects, and the adoption of smart construction machinery has increased by 45%, while electric and autonomous equipment has grown by more than 35%, with 50% of new units equipped with GPS and telematics⁶³.

- **The Indian construction machinery ecosystem.**

The Indian construction machinery market is expected to grow from \$8.550 billion in 2025 to \$9.24 billion in 2026, projecting to reach \$13.61 billion by 2031, with a CAGR of 8.05%. This growth is supported by the National Infrastructure Plan, a \$1.4 trillion program that is accelerating orders for earthmoving, road construction, and materials handling equipment⁶⁴.

The ICEMA (India Construction Equipment Manufacturers Association) has predicted that the Indian construction equipment market will triple its current size and become the world's second largest construction equipment market by 2030, expressly recommending taking advantage of export opportunities and rising domestic demand⁶⁵.

The leading manufacturers in the Indian market include Tata Hitachi Construction Machinery, Mahindra Construction Equipment, Larsen & Toubro (L&T) Construction & Mining Machinery, JCB India, Caterpillar India, Komatsu India, BEML Limited, and ACE (Action Construction Equipment). These players are deepening their presence in emerging Latin American markets. Latin American countries are increasingly dependent on Indian machinery exports, particularly

⁶² <https://www.researchnester.com/es/reports/construction-equipment-market/1425>

⁶³ <https://www.globalgrowthinsights.com/es/market-reports/construction-and-mining-equipment-market-114392>

⁶⁴ <https://www.mordorintelligence.ar/industry-reports/india-construction-equipment-market>

⁶⁵ <https://www.india-briefing.com/news/el-mercado-indio-de-maquinaría-de-construcción-sera-el-segundo-del-mundo-en-2030-32715.html/>



excavators, as manufacturers like JCB, Hitachi (under its Indian brand), and SANY offer world-class equipment at significantly lower prices than those from the United States, Japan, or Germany, leveraging lower manufacturing costs and streamlined processes⁶⁶.

- **Relevance for Venezuela.**

The reactivation of Venezuelan infrastructure—roads, bridges, housing, and civil works linked to the oil sector—has generated an unmet structural demand for heavy construction machinery. According to analysis by Reuters Energy, private investment in Venezuela increased from \$0.9 billion in 2025 to a projected \$1.4 trillion in 2026 in the oil sector alone, with a particular emphasis on aging infrastructure that requires urgent investments in maintenance, automation, and safety. This context presents a direct opportunity for Indian-made earthmoving equipment (excavators, backhoes, loaders), compactors, cranes, and concrete mixers, whose differentiating factor compared to traditional suppliers is its price-quality ratio⁶⁷.

Mining Machinery

- **Global Market**

The global mining machinery market was valued at US\$25.94 billion in 2025 and is projected to reach US\$37.17 billion by 2032, with a CAGR of 4.6% over the forecast period. The metals segment dominated the market in 2024, driven by increasing global demand for iron, copper, gold, and aluminum; while the critical minerals segment—necessary for electric vehicles, batteries, and energy transition technologies—is experiencing the fastest growth rate⁶⁸.

- **Strategic Relevance for Venezuela: The Orinoco Mining Arc**

Venezuela possesses exceptional mining potential concentrated primarily in the Orinoco Mining Arc (AMO), an area of over 113,598 km², equivalent to 12.4% of the national territory, where reserves of gold, diamonds, coltan, copper, iron, and bauxite are located, with the potential participation of 150 companies from 35 countries. Venezuela has 48 types of metallic, non-metallic, and strategic minerals, among which gold, copper, diamonds, and coltan stand out. These minerals have the potential to contribute to diversifying the country's sources of foreign exchange beyond oil⁶⁹.

In terms of recent operations, Venezuela extracted 9.5 tons of gold during 2025 and aims to surpass that figure, while in the last quarter of the same year, iron ore exports reached their highest point in the last decade. This performance, while significant, reflects the ample room for growth if the sector is modernized and formalized with appropriate equipment⁷⁰.

⁶⁶ <https://svmmachineryindia.com/es/why-latin-american-companies-are-importing-excavators-from-india/>

⁶⁷ [Oil Opening in Venezuela 2026: Supplier Opportunities](#)

⁶⁸ [Mining Machinery Market Size, Share & Forecast to 2032](#)

⁶⁹ [Orinoco Mining Arc drives comprehensive development model for Venezuela | Central Bank of Venezuela](#)

⁷⁰ <https://desarrollominero.gob.ve/?p=67210>



India, as one of the world's largest exporters of machinery for the steel, mining, and petrochemical industries, is well-positioned to supply the crushing, pulverizing, and screening equipment, mining trucks, and surface machinery that Venezuela's formal sector needs to scale up its production. This opportunity is particularly relevant in the context of the India-Venezuela bilateral discussions on cooperation in the Global South.

Industrial and manufacturing machinery

- **Global market.**

The global industrial machinery market was estimated at \$714.5 billion in 2024, with an expected CAGR of 9% between 2025 and 2034. The construction segment accounted for over 43.2% in 2024 with projected growth of 9.4% through 2034, while demand for excavators, loaders, cranes, and concrete mixers is driven by public and private investment in residential, commercial, and industrial projects⁷¹.

- **India's export capabilities.**

India is one of the world's largest exporters of machinery required in the steel, mining, fertilizer, cement, and petrochemical industries, as well as various types of heavy machinery. India's industrial machinery market was valued at approximately US\$5.60 billion in 2021, with projections to reach US\$9.4 billion by 2027. According to India's Ministry of Commerce, in the fiscal year 2023-24, nuclear reactors, boilers, and machinery accounted for 6.9% of the country's total exports, while electrical machinery and equipment made up an additional 7.9%⁷².

Additionally, India exports a wide range of electrical products, including transformers, generators, and household appliances, which are essential for industrial and residential development in various regions of the world⁷³.

- **Relevance for Venezuela.**

Venezuela's installed capacity utilization (ICU) is around 52%, meaning the country has partially operational manufacturing infrastructure that requires technological modernization rather than new construction. Importing Indian industrial machinery—for sectors such as food, cement, petrochemicals, plastics, and light manufacturing—represents a relatively low-cost lever for increasing ICU, given the alignment of Indian "frugal engineering" with the capital access and maintenance conditions that characterize Venezuela's industrial sector.

Electrical and energy equipment

- **Global market.**

The deterioration of Venezuela's electrical system constitutes a structural need that transcends the agricultural or industrial sectors. Venezuela requires a comprehensive intervention

⁷¹ [Industrial machinery market size, share report 2026-2035](#)

⁷² <https://santandertrade.com/es/portal/analizar-mercados/india/cifras-comercio-exterior>

⁷³ [Exports from India - Dietrich Logistics Colombia](#)



that includes the modernization of its physical infrastructure, including refineries, storage systems, and industrial safety equipment, much of which is severely deteriorated due to years of underinvestment and inadequate maintenance⁷⁴.

India boasts a well-established ecosystem for electrical and power generation equipment. Companies such as Bharat Heavy Electricals Limited (BHEL), Adani Green Energy, Tata Power, and Suzlon are leading players in the manufacturing and export of transformers, generators, solar panels, turbines, and electrical distribution systems. The International Energy Agency recorded a global investment of \$446 billion in the renewable energy sector in 2021, with Asia-Pacific—led by India and China—being the region with the highest demand for new transformers and grid equipment for integrating renewable energy sources⁷⁵.

The modernization of Venezuela's electrical system—identified as a necessary condition for overall economic recovery—opens a window of opportunity for Indian solutions in distributed solar generation, energy storage systems, and electrical substation equipment. This aligns directly with the India-Venezuela cooperation agenda within the framework of the International Solar Alliance (ISA) and the bilateral commitment of January 2026.

Specific requirements of Venezuela in the different types of machinery

The Venezuelan economic recovery, which registered 18 consecutive quarters of growth by the end of 2025 and an 8.5% increase in GDP that year⁷⁶ This has not resolved the accumulated structural deficit in machinery and equipment. On the contrary, growth itself is driving up demand that the aging and underfunded national fleet cannot meet. The specific sectoral requirements, broken down by type of machinery, are detailed below.

Requirements for agricultural machinery

The Venezuelan agricultural sector has the most documented and quantified machinery deficit in the country. Farmers are urgently requesting financing to acquire the 80,000 tractors, 20,000 sprayers, and 15,000 seeders needed to consolidate increased production, especially given that 95% of existing tractors had already exceeded their useful life by 2022.⁷⁷ This figure is not a marginal estimate: it reflects the gap between the 30,000 to 35,000 units that would be required just to reach the country's potential cultivable area and the actual operational fleet.

The president of Fedeaagro, Celso Fantinel, stated in 2025 that between 5,000 and 6,000 tractors will need to be imported annually, but only 10% of that requirement is currently being met. Irrigation systems are obsolete or damaged, and fuel shortages—especially diesel—remain a recurring problem for agricultural machinery.⁷⁸ For its part, the Venezuelan Chamber of Distributors of Spare Parts, Heavy Equipment, and Agricultural Equipment (Cavedrepa) indicates an 80% deficit

⁷⁴ [Venezuela, the global energy challenge - Energy Factor](#)

⁷⁵ [Power Transformer Market Size 2025-2034, Global Trends Report](#)

⁷⁶ https://www.aporrea.org/economia/a348820.html#google_vignette

⁷⁷ <https://www.bancaynegocios.com/exclusivo-95-de-los-tractores-acabo-su-vida-util-y-la-maquinaria-agropecuaria-tiene-20-anos-obsoleta/>

⁷⁸ <https://www.bancaynegocios.com/perspectivas-de-la-agricultura-en-venezuela-mas-oportunidades-que-desafios-o-mas-desafios-que-oportunidades/>



in imported agricultural machinery needed to meet the needs of farmers, noting that Venezuela only imports 20% of the tractors and other tools the sector requires. These acquisitions, while not eliminating the deficit, have served to replace machinery that is 25 years old⁷⁹.

In financial terms, Fedegro indicates that at least \$1.5 billion in financing is required to cover all annual investment needs to boost Venezuelan agriculture.⁸⁰ Faced with this scenario, Cavedrepa has begun negotiations with Venezuelan authorities to obtain tax incentives that will facilitate the importation of state-of-the-art agricultural machinery, seeking to ensure that the benefits of Legal Regime 9 accrue to distributors in order to broaden their impact on the sector⁸¹.

Requirements for construction machinery and infrastructure

Venezuela faces a historic housing and infrastructure deficit. According to 2022 figures from the Venezuelan Chamber of Construction, the housing deficit in Venezuela stands at 2.2 million homes, a figure that remains unchanged today and does not include those that require repair or improvement due to infrastructure deficiencies.⁸² Added to this is the deterioration of the national road network, school infrastructure, drinking water systems and sanitation works, which have accumulated decades of underinvestment.

Despite this, the construction sector registered a growth of 14% in 2025⁸³ and the Venezuelan government created the Infrastructure and Services Fund aimed at stabilizing the electrical system, restoring the national road network, and optimizing the supply of drinking water.⁸⁴ In this context, the demand for heavy construction machinery—excavators, backhoes, bulldozers, cranes, compactors, concrete mixers—is structural and immediate.

The reactivation of the oil industry has generated a direct and documented demand for cranes, construction machinery, forklifts, construction equipment, lighting towers, and generators, which are currently being shipped from the port of Houston to Venezuela. This is the type of equipment that the oil sector urgently requires to support its operations.⁸⁵ This demand, which is currently supplied mainly from the United States, represents a supplier substitution opportunity for India, given the cost differential offered by Indian manufacturers compared to North American ones.

Specific requirements in this subsector include:

- **Earthmoving equipment:** Excavators, bulldozers and motor graders for road, housing and oil projects.

⁷⁹ <https://primicia.com.ve/economia/cavedrepa-deficit-de-maquinaria-agricola-importada-es-de-80/>

⁸⁰ <https://visionagropecuaria.com.ve/perspectivas-de-la-agricultura-en-venezuela-mas-oportunidades-que-desafios-o-mas-desafios-que-oportunidades/>

⁸¹ <https://avisavenezuela.org/resumen-informativo-del-21-hasta-el-27-de-octubre-de-2025/>

⁸² <https://www.bancaynegocios.com/perspectivas-de-la-agricultura-en-venezuela-mas-oportunidades-que-desafios-o-mas-desafios-que-oportunidades/>

⁸³ <https://www.industrias.gob.ve/2025/12/sector-construccion-registra-un-crecimiento-del-14-en-2025/>

⁸⁴ <https://www.aporrea.org/economia/a348820.html>

⁸⁵ <https://misionverdad.com/venezuela/como-crecera-la-actividad-petrolera-venezolana-en-2026>



- **Lifting and loading equipment:** Cranes, forklifts and loaders for infrastructure works and port operations.
- **Compaction and paving equipment:** For the National Road Plan and the recovery of roads.
- **Concrete pouring equipment:** Concrete mixers and pumps for the housing program (Great Housing Mission Venezuela).
- **Emergency generators:** To alleviate electrical failures in construction sites and oil camps.

Requirements for mining machinery

The Ministry for Mining Development's 2019-2025 Sectoral Mining Plan estimated gold production at 67.3 tons, and at Expo Metal 2025 the Venezuelan government secured the signing of more than 200 trade agreements and eight strategic investment memoranda in the mining sector, with the participation of representatives from more than 30 nations.⁸⁶ The Venezuelan mining sector is in a process of formalization and expansion that requires urgent technological upgrades to move from artisanal and informal exploitation to a sustainable industrial operation.

The specific requirements of the Venezuelan mining sector include:

- **Surface extraction machinery:** Front loaders, mechanical shovels and hydraulic excavators for operations in the Orinoco Mining Arc.
- **Crushing and grinding equipment:** Jaw crushers, ball mills and vibrating screens for mineral processing (gold, iron, bauxite, coltan).
- **Mining transport:** Large tonnage articulated trucks (dumpers) and conveyor belts for the movement of materials in open-pit mines.
- **Benefit teams:** Cyanidation plants for gold, flotation plants for non-ferrous minerals and magnetic separators.
- **Machinery for the steel industry:** Briquetting machines and direct reduction furnaces, given that Venezuela plans to recover 90% of the installed capacity of Briquetas del Caroní (Briqcar), reaching 740,000 tons of briquettes per year by 2026⁸⁷.

Requirements for industrial and manufacturing machinery

The installed capacity utilization (ICU) of the Venezuelan manufacturing sector reached 48.4% in the first quarter of 2026, an improvement compared to 45.8% in the same quarter of 2025. The president of Conindustria, Tito López, indicated that there is still 51.6% available capacity, representing an opportunity for immediate growth if the right incentives are implemented.⁸⁸ This

⁸⁶ <https://www.sinembargo.mx/4746786/datos-tiene-petroleo-gas-oro-tierras-raras-venezuela-es-el-gran-pastel-para-eu/>

⁸⁷ <https://mippci.gob.ve/index.php/2025/03/24/ocho-acuerdos-internacionales-en-mineria-en-expo-metal-2025/>

⁸⁸ <https://www.conindustria.org/manufactura-privada-crecio-99-en-el-primer-trimestre-de-2026/>



figure implies that Venezuela is operating at approximately half of its manufacturing potential, largely due to technological obsolescence and a lack of access to modern equipment.

The Venezuelan manufacturing sector closed 2025 with a year-on-year growth of 9.5%, and the president of Conindustria stated that the sector requires at least \$3.5 billion to increase its installed capacity and produce more, noting that the growth achieved was attained "on its own," that is, without the necessary financing or incentives.⁸⁹ This required investment includes, significantly, the technological renewal of the industrial machinery fleet in sectors such as food, beverages, pharmaceuticals, cement, chemicals and metalworking.

The sectors with the highest growth in the first quarter of 2026 were metal casting (53.2%) and auto parts (46.1%), while the manufacture of machinery, electrical equipment, and optics fell by 20.5%, demonstrating that local production of this type of equipment is insufficient and that Venezuelan companies are net importers of industrial machinery. Additionally, 48 unscheduled power outages were recorded in the first quarter of 2026, averaging 127 hours without power outages for every 480 working hours⁹⁰.

Specific requirements for industrial machinery include:

- **Food industry:** Processing, packaging, pasteurizing and industrial refrigeration equipment for the dairy, meat and grain sectors.
- **Cement and construction materials industry:** Mills, rotary kilns and grinding equipment to meet the demand of the construction sector.
- **Metalworking:** Lathes, milling machines, hydraulic presses and welding equipment for the reactivation of the parts and components industry.
- **Pharmaceutical industry:** Freeze-drying equipment, mixers and encapsulators, given the sustained growth of the sector in recent years.
- **Plastics and chemical industry:** Injection molding machines, extruders and chemical reaction equipment.

Requirements for electrical and energy equipment

The Venezuelan electrical system is perhaps the country's most urgent and quantifiable need in terms of equipment. Venezuela's estimated peak electricity demand is around 14,500 MW, which is met 75% by hydroelectric sources and approximately 25% by thermoelectric plants. Forty percent of the electricity generated is lost due to infrastructure deterioration, distribution vulnerabilities, and control system failures.⁹¹ The National Electric System (SEN) requires a near-complete overhaul,

⁸⁹ <https://cronica.uno/conindustria-insta-al-gobierno-a-crear-politicas-publicas-para-fortalecer-manufactura-nacional/>

⁹⁰ <https://www.infobae.com/venezuela/2026/05/14/la-industria-manufacturera-privada-en-venezuela-aumento-mas-de-un-9-en-el-primer-trimestre-de-2026/>

⁹¹ <https://elucabista.com/2026/05/15/recuperar-el-sistema-electrico-nacional-requiere-entre-50-y-90-millardos-de-dolares-segun-ingeniero-alexis-barroso/>



with an estimated investment of over US\$25 billion, to transform Venezuela into an electricity generating hub for both domestic use and export. Installed capacity is projected at around 37.46 GW by 2025, but actual operational availability is between 12,000 and 16,000 MW—less than 40-50% of the total—due to lack of maintenance, fuel shortages, and widespread equipment obsolescence⁹².

The current state of the Venezuelan electrical grid includes conductors installed with more than 30 years of service without replacement, substations and transformers operating beyond their estimated useful life, and minimal or no preventive inspection in critical sections of the network.⁹³ Technical and non-technical losses are estimated at 40% of the total energy generated, and failures are recorded in substations due to obsolete equipment and lack of spare parts⁹⁴.

The specific requirements in this subsector include:

- **Power transformers:** For modernization of transmission and distribution substations, most of which have been in operation for more than three decades without replacement.
- **Gas turbines:** For the rehabilitation of thermoelectric plants that currently operate at less than 50% of their potential capacity.
- **Distributed solar generation systems:** Given Venezuela's enormous photovoltaic potential and the need to decentralize power generation to reduce vulnerability to grid failures, investment in renewable energies such as solar and wind power could alleviate the burden on the hydroelectric system and reduce vulnerability to climate variations, as Venezuela has enormous potential to harness these new energy sources⁹⁵.
- **Emergency power generation equipment:** Generators for oil fields, hospitals, industrial facilities and communities, given that in May 2026 a historic record demand of 15,579 MW was registered, the highest figure in nine years⁹⁶.
- **Cables and conductors:** For the replacement of distribution lines that have been in service for more than 30 years.
- **Automation and control systems:** For substations, under the IEC 61850 standard, that allow remote monitoring and reduction of non-technical losses.

⁹² <https://elucabista.com/2026/05/15/recuperar-el-sistema-electrico-nacional-requiere-entre-50-y-90-millardos-de-dolares-segun-ingeniero-alexis-barroso/>

⁹³ <https://electroenergyic.com/red-electrica-venezolana-el-coste-de-no-modernizar/>

⁹⁴ <https://electroenergyic.com/estado-actual-del-sistema-electrico-en-venezuela-desafios-y-oportunidades/>

⁹⁵ <https://daviduzcategui.com.ve/wpdu/2025/03/28/un-camino-hacia-la-estabilidad-electrica-en-venezuela/>

⁹⁶ <https://www.elnacional.com/columnas/2026/05/la-nueva-oportunidad-para-la-industria-electrica-en-venezuela/>

**Summary table: Venezuela's requirements by type of machinery**

Type of machinery	Key requirement	Magnitude of the deficit	Priority
Agricultural	80,000 tractors; 20,000 sprayers; 15,000 seeders; irrigation equipment	80% not covered; only 20% of what is required is received	Urgent
Construction	Earthmoving equipment, cranes, compactors, mixers	Housing deficit: 2.2 million homes; deteriorated roads	High
Mining	Equipment for mineral extraction, crushing, transport and processing	Almost no technological advancement in the Orinoco Mining Arc	High
Industrial/manufacturing	Machinery for food, pharmaceutical, cement, and metalworking industries	ICU at 48.4%; sector requires \$3.5 billion for capitalization	Medium-High
Electrical/Energy	Transformers, turbines, generators, solar systems, conductors	Estimated investment: \$25-\$50 billion; 40% network losses	Urgent

Source: Own elaboration, 2026. Based on Fedeaagro (2025), Cavedrepa (2025), Venezuelan Chamber of Construction (2022), Conindustria (2026), El Nacional (2026), El Ucabista (2026) and specialized sources cited in this section.



PART IV

CASE STUDY: PENETRATION OF INDIAN TRACTORS IN VENEZUELA

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Venezuela is a crucial entry point for Indian agricultural machinery exports, serving as a strategic gateway to the vast Latin American market. The strategy for Indian tractors entering Venezuela has evolved beyond simple trade, now focusing on local assembly models and the establishment of long-term partnerships. This approach is clearly illustrated by the example of Sonalika Tractors and its confirmed partnership with the local company Venequirca.

General Agricultural Context

According to the reconfiguration of the Venezuelan economic landscape during the 2024-2025 period, the agri-food sector had been positioned as one of the key elements for moving towards a post-rentier production model. By the beginning of 2026, an estimated growth of 8.6% had been reported, driven mainly by strategic commodities due to their short cycle and ease of industrialization, such as rice, white corn, and sugarcane⁹⁷. This initial boost positioned the Venezuelan agricultural sector on a path of sustained growth and diversification of its productive offer at the national and international levels. However, the consolidation of this growth is taking place in an environment of political and exchange rate instability, which requires an understanding of value chains and investment in agricultural support.

Principales Rubros Agrícolas Vegetal ESTIMADO DE PRODUCCION 2023/2024 <i>(En Toneladas Métricas)</i>								
Rubros	Consumo deseable Nacional	2022	2023	2024	2025	Crecimiento 23/2024 (%)	Crecimiento 24/2025 (%)	Autoabastecimiento to 2024 (%)
Maiz Blanco	1,100,000	720,000	693,000	830,000	790,000	20	-4.8	72%
Maiz Amarillo*	1,500,000	370,000	340,000	580,000	620,000	71	6.9	41%
Arroz Banco*	900,000	464,000	562,000	561,000	750,000	-0	33.7	83%
Sorgo*	1,800,000	3,300	2,500	1,500	1,000	-40	-33.3	0%
Caña de Azúcar	8,500,000	2,810,000	3,554,000	4,150,000	5,000,000	17	20.5	59%
Café*	1,800,000	658,000	896,000	920,000	1,200,000	3	30.4	67%
Papa*	400,000	216,000	246,400	210,000	200,000	-15	-4.8	50%
Tomate	300,000	60,000	82,500	80,000	83,000	-3	3.8	28%
Cebolla	200,000	62,000	88,200	75,000	70,000	-15	-6.7	35%
Pimentón	108,000	17,000	21,000	18,000	20,000	-14	11.1	19%
Naranja	150,000	5,600	3,500	3,200	3,000	-9	-6.3	2%
Soya	720,000	13,000	9,000	7,000	7,500	-22	7.1	1%
Frijol*	130,000	77,000	66,000	58,000	50,000	-12	-13.8	38%
Ajonjolí*	1,000	5,200	12,500	9,000	10,000	-28	11.1	n/a

Source: Fedegro (n.d.), as cited in Banking and Business (2025).

Also, the Venezuelan agricultural industry is characterized by generally low levels of technology (leading to low productivity), with the exception of some crops (rice, corn, or sugarcane); a dual structure marked by land concentration, low investment, and historical dependence on oil subsidies⁹⁸. Thus, a combination of family and traditional agriculture (small and medium-sized subsistence farms) predominates, alongside limited agro-industrial systems that are gradually recovering. These production models were significantly affected by the exchange rate differential

⁹⁷ <https://radiomiraflores.net.ve/sector-agricola-crecio-86-en-2025/>

⁹⁸ <https://www.fao.org/4/ak170s/ak170s00.pdf>



experienced between 2024 and 2025, where high replacement costs diminished the capacity for projected production⁹⁹. This scenario could be reversed this year.

From this perspective, India being an agricultural powerhouse (as the world's largest producer of rice or the largest exporter of spices)¹⁰⁰, possesses the financial and operational capacity to expand the productive potential of Venezuelan soil. This could be achieved through the direct export of complex fertilizers or biostimulants, as well as through the export of technology and knowledge of production processes. This would fall within the framework of strengthening bilateral relations, which includes agriculture as a central focus for investment and technological cooperation¹⁰¹.

Soil Study

A. General Overview

Venezuela boasts exceptional soil diversity. The taxonomic system adopted is the Seventh Approximation of the USDA Soil Taxonomy, under which Venezuela has 9 of the 12 orders recognized worldwide: Entisols, Inceptisols, Vertisols, Mollisols, Ultisols, Oxisols, Aridisols, Histosols, and Alfisols¹⁰². Large-scale agricultural production in Venezuela is concentrated in the western and central states. The states of the west-central region (Lara, Yaracuy, and Portuguesa) contribute the most to agricultural and livestock activity, accounting for over 60% of the country's total agricultural and livestock land¹⁰³.

Portuguesa state is, in particular, the agricultural epicenter of Venezuela. With an area of 15,000 km² and a total of 1,500,000 hectares, of which approximately 800,000 are suitable for agriculture (more than 80% of its territory), Portuguesa is officially recognized as the breadbasket of Venezuela¹⁰⁴. Its soils produce more than 50% of the national corn production, 65% of the rice, 52% of the sugar cane, 70% of the sunflower, and 95% of the sesame¹⁰⁵.

B. Integrated Regional Matrix

State / Region	Land Order	Main Crop	Water Requirement	Agricultural Limitation
Guárico	Vertisols	Rice, cotton, corn	High (seasonal irrigation)	Contraction/expansion, restricted tillage windows

⁹⁹ <https://fedegro.org/wp-content/uploads/2025/03/Resultados-2024-WEB.pdf>

¹⁰⁰ <https://www.reuters.com/world/india/indias-2025-rice-exports-surge-near-record-curbs-lifted-2026-01-10/>,

<https://www.commerce.gov.in/about-us/divisions/export-products-division/export-products-agriculture>

¹⁰¹ <https://theindianeye.com/2026/01/31/india-and-venezuela-agree-to-deepen-partnership-across-trade-investment-energy/>

¹⁰² <https://aprendiendopedologia.wordpress.com/2011/04/07/tipos-de-suelo-en-venezuela/>

¹⁰³ https://fscluster.org/sites/default/files/documents/hacia_una_caracterizacion_del_actual_que_hacer_agropecuario.pdf

¹⁰⁴ <http://www.bav.com.ve/index.php/portuguesa-es-el-granero-de-venezuela/>

¹⁰⁵ <http://www.psuv.org.ve/temas/noticias/portuguesa-agricultura-venezuela-economia-produccion/>



Portuguese	Alfisols / Inceptisols	Corn, rice, sugarcane, sunflower	Medium-High (supplementary irrigation)	Risk of compaction due to mechanization
Barinas	Entisols / Ultisols	Rice, corn, coffee	Medium (rain + irrigation)	Acidity, low fertility
Apure / Cojedes	Ultisols	Corn, sorghum, livestock	Low-Medium (extensive)	High acidity, low pH, low CEC
Northern Zulia / Falcón	Dry sols	Onion, tomato, fruit trees	Very High (drip irrigation essential)	Severe water deficit, salinization
Southern Zulia (South of the Lake)	Entisols / Inceptisols	Plantain, cassava, cocoa	Half	Poor drainage, bad drainage
Aragua / Carabobo	Soft sols	Corn, sugarcane, vegetables	Low-Medium	Compaction by continuous mechanization
Mérida / Táchira	Inceptisols (slopes)	Potatoes, coffee, vegetables	Variable (localized irrigation)	Severe erosion on slope, irregular topography
Lara	Aridisols / Inceptisols	Sisal, onion, cane	High (essential risk)	Aridity, usage restrictions

Source: Own elaboration, based on: INDER¹⁰⁶, IAGUA/ICEX¹⁰⁷, Wordpress¹⁰⁸, OAS¹⁰⁹, SciELO Venezuela¹¹⁰, APPROVED¹¹¹, and FAO¹¹².

¹⁰⁶ <https://inder.gob.ve/sistemas-de-riego-aliado-fundamental-hacia-la-soberania-agroalimentaria/>

¹⁰⁷ <https://www.iagua.es/noticias/icex-espana-exportacion-e-inversiones/mercado-sistemas-riego-crece-44-venezuela>

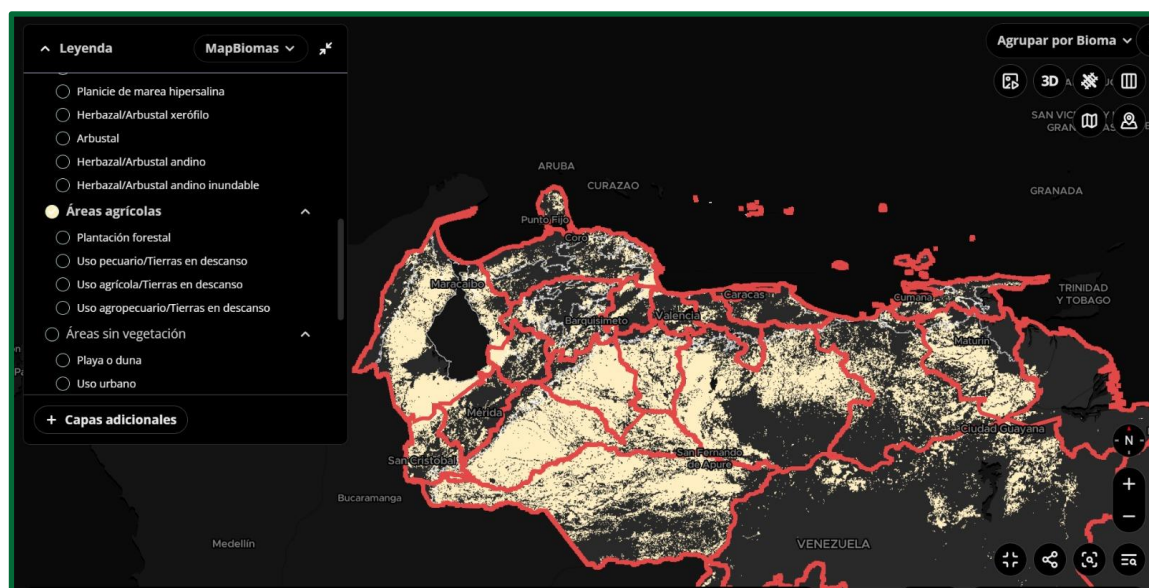
¹⁰⁸ <https://aprendiendopedologia.wordpress.com/2011/04/07/tipos-de-suelo-en-venezuela/>

¹⁰⁹ <https://www.oas.org/dsd/publications/unit/oea30s/cho26.htm>

¹¹⁰ https://ve.scielo.org/scielo.php?script=sci_arttext&pid=S0002-192X2009000100003

¹¹¹ <https://aprogat.org/estados-agricolas-venezuela/>

¹¹² <https://openknowledge.fao.org/server/api/core/bitstreams/8cd56fde-1732-4a08-9b94-e9188a72b355/content>



Source: Mapbiomes (2026), own configuration¹¹³. Map that refers to agricultural areas in Venezuela.

Technical Description by Soil Order:

Vertisols, characterized by their high fertility and water retention capacity, are less common but essential for cultivating certain grains—especially rice—and are concentrated in large areas of Guárico state, as well as Falcón, Yaracuy, Lara, Barinas, Portuguesa, and Anzoátegui. Ultisols, clayey and acidic soils (low pH) with low fertility, cover large areas of the country, especially in Apure, Guárico, Anzoátegui, Monagas, Zulia, and Cojedes. Aridisols, predominant in arid and semi-arid zones, are distributed in Lara, Zulia, and Falcón, although their abundance is moderate. Alfisols, with a layer of clay accumulation in the subsoil, are fertile and are found in various regions of the country. Mollisols, the most productive agricultural soils in the world, with a surface layer rich in organic matter and high fertility, are specifically located in the states of Aragua and Carabobo, around Lake Valencia, and are the least numerous in the country¹¹⁴. Oxisols, they possess the most advanced horizon development of the intertropical regions. These are highly developed soils but of low natural fertility. Its main components (quartz and kaolinite) are resistant to weathering, and they are found mainly in Bolívar and Amazonas¹¹⁵. Histosols are coarse soils rich in organic matter but difficult to cultivate, requiring special fertilization. In Venezuela, they are found in deltaic and wetland areas, with low agricultural activity, so their relevance to this study is secondary.

Soils with poor drainage—including the Acuic suborders of Vertisols, Inceptisols, Entisols, Ultisols, and Alfisols—cover approximately 20% of Venezuelan territory, equivalent to 18.2 million hectares. These areas are predominantly used for extensive livestock grazing, rice cultivation, and as protected flora and fauna reserves. The main areas with poorly drained soils are: continental deltaic plains, the Apure plains, the Orinoco Delta, the southern shore of Lake Maracaibo, and Caribbean coastal zones¹¹⁶.

¹¹³ [https://plataforma.mapbiomas.org/coverage/coverage_lclu?t\[regionKey\]=venezuela&t\[ids\]\[\]=24-1-1&t\[divisionCategoryId\]=4&t\[id\]=1&t\[themeKey\]=coverage&t\[subthemeKey\]=coverage_lclu&t\[pixelValues\]\[\]=14&t\[legendKey\]=default&t\[year\]=2024](https://plataforma.mapbiomas.org/coverage/coverage_lclu?t[regionKey]=venezuela&t[ids][]=24-1-1&t[divisionCategoryId]=4&t[id]=1&t[themeKey]=coverage&t[subthemeKey]=coverage_lclu&t[pixelValues][]=14&t[legendKey]=default&t[year]=2024)

¹¹⁴ https://www.lifeder.com/tipos-suelos-venezuela/#google_vignette

¹¹⁵ <https://aprendiendopedologia.wordpress.com/tag/oxisoles/>

¹¹⁶ https://ve.scielo.org/scielo.php?script=sci_arttext&pid=S0002-192X2009000100003



C. Soil Evaluation and Agronomic Management

Fertility and amendments:

The disparity in fertility between soil types in Venezuela determines agronomic strategies that differ by region:

- **Ultisols (Cojedes, Guárico, Apure, Barinas):** Old tropical soils (Oxisols and Ultisols) are naturally acidic. Soil acidity interferes with the availability of essential plant nutrients and affects microbial activity. In acidic soils, phosphorus, calcium, magnesium, and potassium are often less available. Liming—the application of lime or alkaline materials—is the most effective practice for neutralizing this acidity¹¹⁷.
- **Mollisols (Aragua, Carabobo):** Mollisols are soils with well-developed horizons. Their surface layer (A horizon) is deep and has a high concentration of organic matter and nutrients, giving them high natural fertility and making them some of the most productive agricultural soils in the world. This high level of available organic matter significantly reduces dependence on synthetic chemical fertilizers, giving producers in Aragua and Carabobo a competitive advantage over producers in less fertile soils¹¹⁸.

Geographic risk zoning:

a) High erosion zones — Andean Region (Mérida / Táchira): Soils with severe erosion problems, which were previously concentrated in the high Andean regions, are now located in the lower parts of the mountain range, especially in the basins of the Chama, Motatán, Uribante, Santo Domingo, Masparro, Boconó, Guanare and Acarigua rivers, and in the central-western region¹¹⁹. The intrazonal soils of Venezuela, due to their susceptibility to erosion, are poorly suited for agriculture and require specific protection systems. In Venezuela, these soils are located in the mountainous areas of the Andes and the state of Falcón, constituting a low-productivity natural environment where water is often the main limiting factor¹²⁰.

b) Areas of poor drainage — Plains of Guárico and Apure: Areas with poor drainage are located mainly in the south of Lake Maracaibo and in the low-lying floodplains of the states of Barinas, Portuguesa, Cojedes, Guárico and Apure¹²¹.

Long-Term Sustainability: Compaction in Alfisols of Portuguesa

Soil compaction is one of the most common physical degradation processes in highly productive agricultural lands and a major cause of reduced productivity. A scientific study conducted in Venezuela evaluated the susceptibility to compaction in four soil series under agricultural use: Valle Lindo and Valle de Quíbor (Lara), Turén (Portuguesa), and El Patillal (Falcón). The standard

¹¹⁷ https://infoagronomo.net/encalado-de-suelos-acidos/#google_vignette

¹¹⁸ <https://aprendiendopedologia.wordpress.com/2011/04/07/tipos-de-suelo-en-venezuela/>

¹¹⁹ <https://openknowledge.fao.org/server/api/core/bitstreams/8cd56fde-1732-4a08-9b94-e9188a72b355/content>

¹²⁰ <https://edafologiaucvenezuela.blogspot.com/2019/>

¹²¹ https://ve.scielo.org/scielo.php?script=sci_arttext&pid=S0378-18442002001200002



Proctor methodology was used to estimate the degree of soil susceptibility to compaction and the moisture contents at which the greatest risks are present¹²².

According to the FAO Country Profile of Venezuela, soil compaction problems are occurring in the flat, low-lying, non-floodable areas of the western high plains as a result of incorporating these lands into agricultural development. The use of machinery with power unsuitable for the type of soil —especially in clayey alfisols of Portuguesa— can cause serious damage to the profile structure, with significant losses in productivity¹²³.

Limitations and global potential

According to the results of the scientific analysis "Desirable Agriculture, a prospect for the year 2000", only approximately 2% of Venezuela's land area has soils suitable for good quality agriculture. Most of the land is restricted for agricultural use by relief (44%), low natural fertility (32%), drainage problems (18%) and aridity (4%)¹²⁴.

D. Technological Insertion in India

The technological gap in Venezuelan agriculture creates a latent demand that current suppliers are not meeting. Leaders of Fedeaagro have acknowledged that in competing countries, tractors operate with GPS, weeds are eliminated with computer-monitored laser equipment, and fumigation is carried out with drones, while Venezuela subsists with obsolete equipment and lacks access to these technologies¹²⁵. In that sense, Indian companies have proven expertise – which gives them a competitive advantage – in three directly applicable segments:

- Soil analysis and sensor technology: Indian companies and startups specializing in IoT sensors for monitoring soil moisture, electrical conductivity, and temperature, applicable to the Alfisols of Portuguesa and Vertisols of Guárico¹²⁶.
- Agricultural drones: The Indian market for agricultural drones has grown exponentially, with companies like ideaForge and Throttle Aerospace Systems offering direct applications in spraying, soil mapping, and crop monitoring¹²⁷.
- Advanced irrigation systems: India is one of the world's leading producers of advanced irrigation systems. Companies like Jain Irrigation Systems are among the global leaders in fertigation and drip irrigation, technologies that are especially in demand in the arid and semi-arid regions of northern Zulia and Falcón¹²⁸.

¹²² https://ve.scielo.org/scielo.php?script=sci_arttext&pid=S1316-33612010000100004

¹²³ <https://openknowledge.fao.org/server/api/core/bitstreams/8cd56fde-1732-4a08-9b94-e9188a72b355/content>

¹²⁴ http://www.sian.inia.gob.ve/revistas_ci/Agronomia%20Tropical/at2802/arti/comerma_j.htm

¹²⁵ <https://www.bancaynegocios.com/exclusivo-95-de-los-tractores-acabo-su-vida-util-y-la-maquinaria-agropecuaria-tiene-20-anos-obsoleta/>

¹²⁶ <https://sustainability17.com/how-precision-agriculture-is-revolutionizing-indian-farming-technologies-workflow-benefits-case-studies/>

¹²⁷ <https://pmc.ncbi.nlm.nih.gov/articles/PMC12349003/>

¹²⁸ <https://es.rivulis.com/rivulis-y-jain-irrigations-international-irrigation-business-se-fusionan/>



Machinery to be used

Based on the above, it is understood that operational efficiency in Venezuelan agriculture depends on the correct correlation between tractor power, the type of tillage implemented, and the soil's mechanical resistance. This is important because inappropriate mechanization is associated with undesirable results, including soil erosion and compaction, with the consequent decrease in fertility, caused by the use of heavy machinery with repeated passes over the field¹²⁹.

AGRICULTURAL SECTOR 2026 Agricultural Mechanization Diagram Decision Tree · Power-Implement-Soil Correlation

FUNDAMENTAL CONCEPTS DIAGRAM Base Correlation for Operational Efficiency

INPUT 1 Tractor Power HP / kW available	+	INPUT 2 Implement Type Tillage / Planting	+	INPUT 3 Soil Resistance Texture / Moisture	->	RESULT OPERATIONAL EFFICIENCY Maximum productivity
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Correct Correlation Preserves soil structure, maximizes fertility, and reduces operational costs per hectare.	Inappropriate mechanization Generates compaction, erosion, and loss of fertility due to repeated passes with heavy machinery.	Compacted soil Increases mechanical resistance, limits rooting, and reduces water infiltration.
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DECISION TREE · POWER-IMPLEMENT-SOIL CORRELATION BY REGION

Selection of machinery according to edaphic region and soil type

REGION / SOIL	REGION / SOIL	REGION / SOIL	REGION / SOIL	REGION / SOIL
Llanos Centrales Vertisols · Expansive	HEAVY	Severe compaction due to expansive clays 2:1; seasonal cracking	Rigid shank ripper 5 shank + Heavy disc plow (9-11 discs)	160–220 HP

¹²⁹ <https://eos.com/es/blog/maquinaria-agricola/>



Cojedes / Guarico Ultisols · Acidic	HEAVY	High acidity + hardened layer (fragipan); low natural fertility	Chisel ripper + Double-action disc harrows	130–180 HP
Portuguesa / Zulia Light Soils · Cereals	HEAVY	Wind and water erosion due to intensive tillage in medium-textured soils	Direct coarse grain planter + Chisel plow (conservation tillage)	120–160 HP
Aragua / Carabobo Mollisols · Sugarcane	MEDIUM	Surface compaction by wet harvesters; loss of organic matter	Low-weight sugarcane harvester + 3-shank subsoiler	100–140 HP
Sur del Lago Entisols / Inceptisols	MEDIUM	Poor drainage + seasonal water saturation; risk of waterlogging	Agricultural trencher + Laser leveler + Tracked tractor (flotation)	100–130 HP
Lara / Falcon Aridisols · Semiarid	LIGHT	Advanced desertification + surface crusting; water scarcity	Conservation cultivator + Integrated drip irrigation system	50–80 HP
Andes Slope Inceptisols	LIGHT	High slope (>15%) + sheet erosion; slope instability in tillage	Hillside micro-tractor + Rotary hoe / Improved animal-drawn cultivator	25–50 HP

SPECIAL NODE · MOTORIZATION ALTERNATIVES

TECHNOLOGICAL INNOVATION AND MOTORIZATION OPTIONS 2026 Special Node · Solutions for high operational restriction contexts			
Dual Diesel-Electric Engines Llanos · Portuguesa Hybrid systems that combine high-torque diesel engines with electric assistance to reduce consumption by up to 30% in deep tillage. 140-180 HP equiv. · Vertisols / Ultisols · - 30% fuel	Agrovoltaic Solar Pumping Lara · Falcón · Andes Photovoltaic systems for irrigation in arid and semi-arid zones, eliminating dependence on fossil fuels in remote areas. 3-15 kWp panels · Aridisols · ROI < 3 years	Tracked Traction South of the Lake · Andes Rubber track tractors for saturated soils and slopes with a gradient of >20%, minimizing ground pressure (<0.6 kg/cm ²). 60-120 HP · <0.6 kg/cm ² pressure · Inceptisols / Entisols	Precision Agriculture All regions GNSS systems and soil resistance sensors (digital penetrometer) to adjust the working depth in real-time. GPS RTK ±2 cm · IoT Sensors · -25% machinery passes



Source: Own elaboration. Edaphological correlations based on the FAO/USDA soil classification for the productive regions of Venezuela. HP indicated as guiding values according to average humidity conditions. Motorization alternatives incorporate technological trends from the global agricultural market 2025–2026.

In the plains states like Guárico and Barinas, where heavy clay soils (Vertisols) predominate, the required machinery must have high traction capacity. The use of tractors with power exceeding 120 HP, equipped with moldboard plows or large-diameter disc plows, is recommended¹³⁰. In these soils, the moldboard plow is especially effective. Its use facilitates the incorporation of plant remains and improves aeration, as it is able to turn over a greater amount of soil. For this type of soil, it is essential to avoid the use of heavy wheeled machinery if the ground is wet¹³¹.

To address the deep compaction characteristic of the Ultisols of Cojedes and Guárico, it is essential to use subsoilers or chisel plows. This work must be carried out with dry soil, allowing the hardened layers to break up to allow the passage of roots and water, without altering the soil profile. Also, understanding that Ultisols are naturally acidic and low in bases (Ca, Mg, K), the use of lime spreaders is recommended to distribute the lime evenly and thus neutralize the soil pH. In turn, the application of fertilizer spreaders is preferred for the use of fertilizers and organic matter that will help maintain productivity. It is important to highlight that, to ensure effective decompaction, the use of subsoilers with high power is recommended, requiring a minimum of 25 to 30 HP per tiller¹³².

In the Portuguesa and Zulia regions, shallower tillage focused on soil conservation is recommended. For ideal preparation of cereals such as corn and sorghum, rotavators (rotary tillers) are very effective, as they break up and mix the soil optimally all at once. In this segment, the norm is medium-sized tractors (80 to 110 HP), as they achieve an ideal balance between productivity and operating cost. On the other hand, in sandy or loose loam (marl) soils, the use of lighter tractors is recommended. This helps prevent sinking and excessive compaction of the topsoil layer¹³³.

In the states of Aragua and Carabobo, where Mollisols predominate—the country's most naturally fertile soils due to their high concentration of organic matter—the required machinery is primarily geared towards mechanized harvesting and seedbed preparation. The predominant crop is sugarcane, for which specialized harvesters are used to chop the stalks and continuously deposit them into a trailer. The sugarcane harvester chops and deposits the cane into a trailer truck, and when this one is full, another is immediately placed in its place without interrupting the work, given that the Mollisols in this region are soils with good structure but susceptible to compaction from mechanization cycles. For continuous operation, it is recommended to alternate implements and monitor tire pressure, prioritizing medium-power tractors¹³⁴. In turn, sugarcane production in Carabobo and Aragua depends critically on the availability of operational machinery: for

¹³⁰ <https://rockzoneamericas.com/posts/how-to-excavate-clay-soil-helpful-tips-for-tough-jobs#:~:text=Cuando%20las%20herramientas%20manuales%20ob%C3%A1sicas,ent%20los%20terrenos%20m%C3%A1s%20dif%C3%A2ciles.>

¹³¹ <https://blog.equipzilla.com/como-elegir-la-maquinaria-adeuada-para-tu-obra-segun-el-tipo-de-terreno/>

¹³² <https://content.ces.ncsu.edu/managing-agricultural-machinery-to-limit-soil-compaction-in-north-carolina#:~:text=Los%20ultisoles%20presentan%20una%20baja,frecuencia%20en%20la%20llanura%20costera.>

¹³³ https://insights.made-in-china.com/es/How-to-Choose-The-Right-Tillage-Machine-According-to-Soil-Type_QTAtlGMvWnIE.html

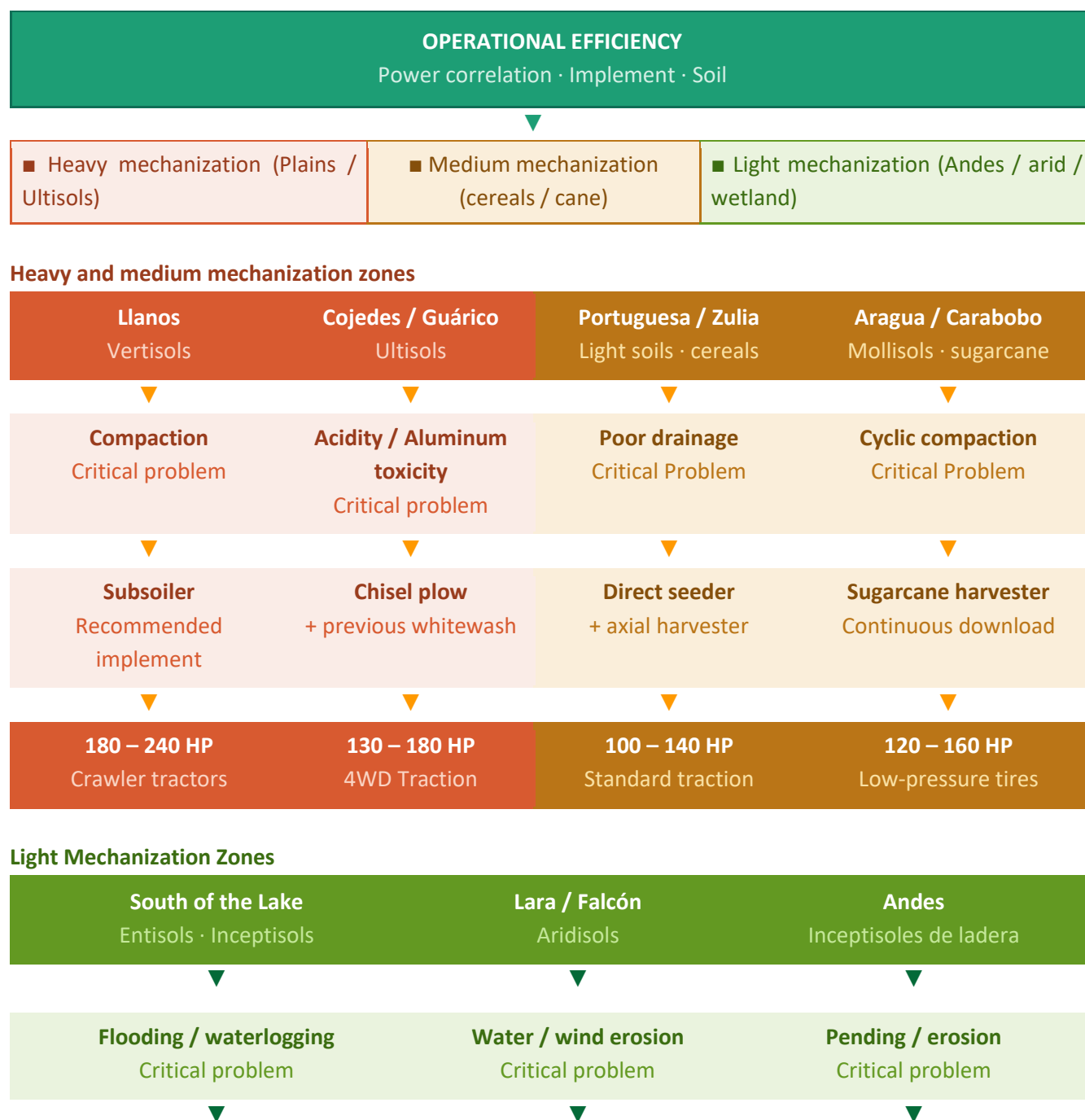
¹³⁴ https://www.scielo.org.mx/scielo.php?pid=S0187-57792012000100001&script=sci_arttext and <https://commercial.bridgestone.com/es-us/resource-center/articles/how-can-you-reduce-soil-compaction#>



the harvest. In 2024-2025, the state of Carabobo estimated to mobilize approximately 140,000¹³⁵ tons of sugarcane, with tractors that the producers themselves acknowledge as obsolete and that should be replaced, although they lack the financial resources to do so¹³⁶. Therefore, the need to adopt technology (which could be foreign) will be crucial to achieving the growth potential.

AGRICULTURAL MECHANIZATION IN VENEZUELA

Diagnosis by region · Operational decision tree



¹³⁵ <https://noticiasvenevision.com/noticias/economia/inicia-la-zafra-de-cana-de-azucar-en-el-estado-carabobo>

¹³⁶ <https://cronica.uno/fedeagro-produccion-agricola-requiere-mas-de-1000-millones-para-su-recuperacion/>



Amphibious harvester Floating platform	Micro-irrigation + minimum tillage	Tiller / motor mower Terraces + strips
▼	▼	▼
80 – 120 HP Wide tracks / tires	50 – 80 HP Compact tractors	15 – 50 HP Articulated Teams

MOTORIZATION ALTERNATIVES Technological innovation for the Venezuelan context		
Dual diesel / CNG engine Reduce fuel cost · Take advantage of domestic gas	Solar photovoltaic pumping Irrigation in arid areas · Without electric grid	Tracked traction Lower ground pressure · Plains and South of the Lake

Source: Own elaboration, 2026. Based on cross-referenced data from specialized sources in the area.

In the southern part of Lake Maracaibo (Zulia state), where the soils are Entisols and Inceptisols with poor drainage, the dominant crop is plantain, followed by cassava, oil palm, and cacao. Agricultural cooperatives in the southern subregion of Lake Maracaibo report that plantains account for 76% of associated producers and 51.5% of the total hectares under cultivation, followed by oil palm with 45.2% of the cultivated area, at least based on scientific studies from a decade ago¹³⁷. The semi-permanent nature of these crops—unlike short-cycle cereals—requires different machinery: priority is given to maintaining internal farm roads (paths between plots), transporting bunches of grapes, and controlling drainage. Medium-horsepower tractors with ditch maintenance implements and leveling harrows are the most suitable for this context, avoiding the use of heavy equipment on wet soils that exacerbate existing waterlogging problems¹³⁸.

The fuel dependence of this machinery is also a critical factor in the region: 90% of the machinery in the south of Lake Maracaibo was paralyzed due to a lack of diesel, directly affecting the harvest of plantains, corn, cassava, and rice¹³⁹. This precedent underscores the relevance of evaluating motorization alternatives with less dependence on fossil fuels, such as dual-fuel tractors or solar pumping systems for drainage work; motorization alternatives that can be covered by India.

In Lara state and the arid region of Falcón, where Aridisols predominate, the main requirement is not for tillage but for water infrastructure. However, for soil preparation prior to planting vegetables, onions, and fruit trees under irrigation, light to medium-sized tractors equipped with disc harrows are recommended to break up the surface crust characteristic of these dry soils, along with precision seeders adapted for row planting with localized irrigation¹⁴⁰.

On the other hand, agriculture in the states of Mérida and Táchira requires a fundamentally different approach. In these areas, the use of heavy machinery is not feasible, either technically or economically, due to the steep slopes characteristic of the Andean inceptisols. In this region,

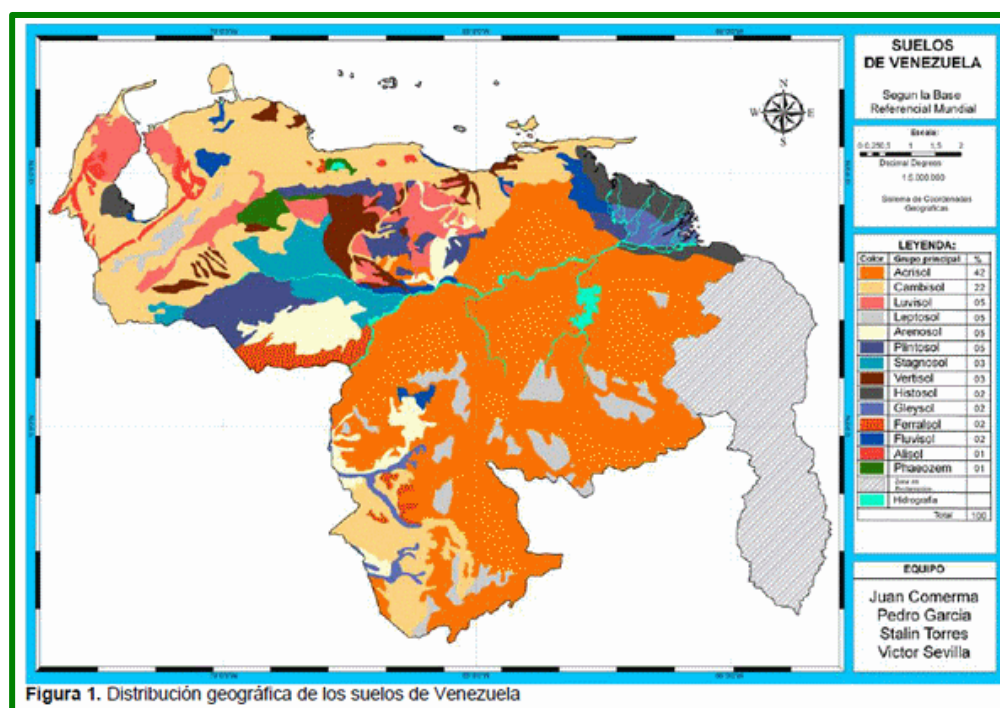
¹³⁷ <https://www.redalyc.org/pdf/622/62242950004.pdf>

¹³⁸ <https://fedepalma.org/wp-content/uploads/2013/11/pdfwebguiabuenaspracticasagricolas.pdf>

¹³⁹ <https://talcualdigital.com/mas-del-70-de-la-produccion-de-platano-en-el-zulia-peligra-por-falta-de-gasoil/>

¹⁴⁰ <https://svmmachineryindia.com/es/best-tractors-for-small-and-medium-farms-in-latin-america/>

demand is concentrated on 6.6 HP to 12 HP tillers and gasoline-powered cultivators. These machines are ideal for tilling on slopes and in small spaces. Furthermore, they offer the advantage of being compatible with various accessories, such as small moldboard plows and furrowers, thus facilitating the planting of vegetables and potatoes. Another application that has generated interest is track traction in mini-tractors. This solution is considered ideal for transporting materials on difficult terrain, where standard tires fail to maintain adequate traction.



Source: Comerma, García and Torres (2013)¹⁴¹.

RESILIENCE AND NEW TECHNOLOGIES MATRIX

Traditional Mechanization vs. Adaptive / Sustainable Mechanization

Agricultural Sector Venezuela · Closing of technical proposal

- Traditional/high-power mechanization ■ Adaptive/sustainable mechanization ■ Limitation/Risk
■ Technological innovation

DIMENSION	⚙️ TRADITIONAL MECHANIZATION Conventional focus · High power	🔧 ADAPTIVE MECHANIZATION Sustainable approach · Appropriate technology
Areas of application	▶ Llanos · Cojedes · Guárico ▶ Portuguesa · Zulia ▶ Large flat extensions ▶ Vertisols and Ultisols	▶ South of the Lake · Lara · Falcón ▶ Andes (Mérida · Táchira) ▶ Hillside, arid, wetland ▶ Inceptisols · Aridisols · Entisols

¹⁴¹ https://www.engormix.com/agricultura/miscellaneous/los-suelos-venezuela-segun_a31198/



Machinery principal	▶ Tractors 130 – 240 HP ▶ Subsoilers · Chisel plows ▶ Axial harvesters ▶ Precision seed drills	▶ Power tillers 6.6 – 12 HP ▶ Mini-crawlers ▶ Amphibious harvesters ▶ Assisted manual seeders
Source of energy	▶ Imported Diesel ▶ High foreign currency dependence ▶ Consumption: 15 – 25 L/h ▶ High operating cost	▶ Diesel / CNG (dual fuel engine) ▶ Solar photovoltaic energy ▶ Gasoline (power tillers) ▶ Consumption: 1 – 5 L/h
Problem critical addressed	▶ Deep compaction ▶ Acidity / toxic aluminum ▶ Poor drainage ▶ Continuous sugarcane harvesting	▶ Extreme slope > 30% ▶ Seasonal flooding ▶ Water and wind erosion ▶ Road isolation on the hillside
Innovation technology	▶ GPS and autopilot ▶ Humidity sensors ▶ Dosing systems ▶ Fleet telemetry	▶ Crawler traction (mini) ▶ Solar pumping · smart irrigation ▶ Modular accessories ▶ Drones for monitoring
Risk / limitation	▶ Obsolescence of the fleet ▶ Lack of spare parts ▶ High indebtedness ▶ Dependence on imports	▶ Slow adoption curve ▶ Rural technical training ▶ Solar initial investment ▶ Specialized maintenance
Viability economic	▶ Profitable > 100 ha ▶ Requires external credit ▶ ROI: 3 – 5 years ▶ High scale required	▶ Profitable from 1 – 5 ha ▶ Microcredit / cooperatives ▶ ROI: 1 – 2 years (solar) ▶ Low scale, high coverage
Policy / legal framework	▶ Importation of heavy machinery ▶ CADIVI / SENIAT · foreign currency ▶ State agricultural credit ▶ Large agricult	▶ Single Window (SAREN) ▶ Renewable energy incentives ▶ Anti-Blockade Law (supplies) ▶ Cooperatives and small prod.

INNOVATION NODE · MOTORIZATION ALTERNATIVES

Cross-cutting technologies for the resilience of the Venezuelan agricultural sector

Dual diesel / CNG engine	Solar photovoltaic pumping	Tracked traction (mini)
◆ Adapts existing tractors ◆ Leverages national gas network ◆ Reduces cost/ha by up to 40% ◆ Applicable: Llanos · Portuguesa	◆ Standalone irrigation without an electrical grid ◆ Ideal: Lara · Falcón · Andes ◆ Can be financed with a microloan ◆ Estimated ROI: 18 – 24 months	◆ Mini-tractors 15 – 50 HP ◆ Mérida · Táchira · South of the Lake ◆ Ground pressure < 0.3 kg/cm² ◆ Compatible with standard accessories

STRATEGIC CONCLUSION

The transition towards an adaptive mechanization model does not replace conventional mechanization: it complements it. The flat, high-production areas (Llanos, Portuguesa, Zulia) will continue to require high-power equipment, but the competitiveness of the sector as a whole will depend on the capacity to integrate low-cost, high-resilience, and territory-appropriate solutions in hillside, arid, and wetland regions. The combination of dual engines, solar pumping, and track traction represents the most viable technological roadmap for the current Venezuelan context.

Source: Own elaboration, 2026.

Investment in machinery and equipment

The Venezuelan agri-food sector is experiencing a recent reactivation, with a notable boost in essential crops such as corn and rice. Despite reporting a growth of 8.6%¹⁴². In the Gross Domestic Product (GDP) for agriculture during 2025, driven by comparative advantages in short-cycle items, this expansion is seriously limited. The main obstacle is structural: the technical obsolescence and technological backwardness of its agricultural support infrastructure significantly restrict the sector's installed capacity. According to Fedegro, the country's fleet of agricultural machinery and equipment has exceeded its useful life, making a large-scale renewal essential¹⁴³. Although the situation arisesThis presents a structural challenge to the sector's productivity, while also being seen as an opportunity for foreign direct investment and trade.

Venezuela does not produce its own irrigation systems or heavy machinery in significant quantities, resulting in total dependence on imports. However, the 44% growth surge in the irrigation systems market demonstrates how technological substitution (in this case, the importation of polypropylene pipes and fittings) generates growth. It should be noted that the market for supplies and equipment is dominated by products of Spanish, American, and Chinese origin, which enjoy a strong reputation and market position due to their resistance to Venezuela's tropical climate. As previously mentioned, investment in the agricultural sector, particularly regarding machinery, cannot be approached uniformly; the success of the operation depends on studies of the country's economic geography, as well as soil studies for each state. Therefore, it is recommended that investment focus on two key areas:

1. Heavy traction on the plains:

In states like Guárico, Barinas and Cojedes, where clayey and heavy soils predominate (vertisols and ultisols), the mechanical resistance of the soil requires investment in high-horsepower tractors equipped with moldboard plows or subsoilers. This type of machinery is necessary due to the deep compaction that typically occurs in this soil during the dry season.

¹⁴² <https://radiomiraflores.net.ve/sector-agricola-crecio-86-en-2025/>

¹⁴³ <https://www.iagua.es/noticias/icex-espana-exportacion-e-inversiones/mercado-sistemas-riego-crece-44-venezuela>



2. Micromechanization in the Andean region:

For the states of Mérida and Táchira, the presence of slopes and young Inceptisols makes the use of heavy machinery technically and financially unfeasible due to the high risk of erosion. For efficiency, the most optimal solution would be the importation and investment in motorized cultivators, tillers, and mini-tractors with tracked traction, which maintain grip on steep slopes.

Regarding investment in the irrigation sector, Venezuela has sufficient freshwater resources to double its current production under a water management investment scheme. This creates opportunities for an agricultural transition based on precision irrigation.

Agromechanical Zoning Matrix and Commercial Opportunities

Venezuelan Agricultural Machinery Sector · Regional Analysis by Soil Profile and Investment Window

AGROMECHANICAL INTELLIGENCE ANALYSIS

Region / States	Soil Profile & Main Crop	Power Requirement (HP)	Specific Implements	Operational Challenges	Opportunity Window for Indian Industry
Guárico & Barinas (Heavy Plains)	Vertisols — expansive, very heavy clay soils. Crops: extensive cattle ranching, short-cycle maize and sorghum.	>120 HP High traction required	- Moldboard plows (deep soil inversion needed). - Large-diameter disc plows. - Avoid heavy wheeled machinery on wet terrain.	High mechanical soil resistance. - Severe compaction during dry season. - Structural damage risk if worked wet.	High-power tractors (>120 HP) Sonalika/Mahindra high-traction models with moldboard and disc plow packages. Long-term supply contracts and local assembly partnerships (Venequirca model).
Cojedes & Guárico (Ultisols)	Ultisols — naturally acid, low in Ca, Mg, K. Require chemical amendment before the	≥25–30 HP per subsoil shank	- Subsoilers / chisel plows (dry-soil operation). - Lime spreaders (pH neutralization). - Fertilizer spreaders /	Deep compaction hardpan layers. - Structural crusting in dry season. - Chronic soil acidity limiting yields.	High-power subsoilers + amendment equipment India can supply high-power subsoiler kits and precision lime/fertilizer spreaders. Alternative motorization (biofuel,



	production cycle.		organic matter applicators.		CNG) addresses chronic diesel scarcity.
Portuguese & Zulia (Cerealiculture)	Variable loam-sandy soils. Shallow tillage zone. Main crops: maize and sorghum for national food supply.	80–110 HP Medium tractors	• Rotavators / rotary tillers (single-pass seedbed prep). • Disc harrows for lighter soils. • Lighter tractors on sandy or loam terrain.	• Sandy soils prone to sinkage with heavy equipment • Need for soil-conservation tillage. • Operational cost pressure from diesel prices.	Medium-range tractors + rotavators 80–110 HP Sonalika/TAFE models. Rotavator implements packages for single-pass seedbed preparation. Competitive price point vs. Chinese/European equivalents.
Aragua & Carabobo (Mollisols)	Soft soils —highest natural fertility in Venezuela (high organic matter). Dominant crop: sugarcane. Secondary: vegetables, grains.	Medium Specialized harvesters	• Sugarcane harvesters (continuous chop-and-load). • Implement rotation to prevent compaction. • Tire pressure management.	• Compaction from continuous mechanization cycles • Carabobo: 140,000 t sugarcane estimate with obsolete fleet. • Producers lack capital for fleet renewal.	Urgent fleet replacement — highest ROI zone Sugarcane harvesters and medium tractors. Carabobo's 2024–2025 harvest deficit with an aging fleet is a direct entry point for Indian machinery financing or leasing schemes.
South of the Lake from Maracaibo (Zulia)	Entisols & Inceptisols — poor drainage, semi-permanent crops. Plantain (76% of producers),	Medium Avoid heavy loads	• Channel maintenance implements. • Leveling harrows. • Solar pumping systems for drainage control.	• Severe waterlogging / drainage deficit. • 90% of machinery paralyzed by diesel shortage. • Heavy equipment worsens flooding.	Alternative motorization — critical window Dual-fuel / CNG tractors and solar drainage pumping systems directly address the 90% paralysis rate. India (Adani Green, Tata Power) can lead solar



	oil palm (45.2% of area), cassava, cacao.		• Light transport for produce bunches.		pump deployment under ISA frameworks.
Lara & Falcon (Arid Zone)	Dry soil— arid, characteristic surface crust. Irrigated vegetables, onion, stone fruits under precision irrigation.	Light – Medium Priority: water infra.	• Disc harrows (surface crust-breaking). • Precision seeders for furrow irrigation. • Localized / drip irrigation infrastructure.	• Main constraint is water, not tillage. • Full import dependency for irrigation systems. • 44% growth in the irrigation systems market.	Water infrastructure investment — strategic opportunity Venezuela has sufficient freshwater resources to double current production under precision irrigation. India's expertise in drip irrigation (Jain Irrigation) and solar water pumps is directly applicable.
Mérida & Táchira (Andes)	Young Inceptisols — steep slopes, high erosion risk. Vegetables and potato. Small, fragmented plots.	6,6–12 HP Micromechanization only	• Motorized cultivators / gasoline-powered tillers • Mini-tractors with crawler / track traction • Accessories: small moldboard plows and furrowers • Crawler traction for steep-terrain transport	• Heavy machinery technically & financially inviable. • High erosion risk on steep slopes. • Small plot size limits equipment scale.	Micromechanization niche — high unit demand India manufactures cost-competitive motorized cultivators and tracked mini-tractors for Andean smallholders. High unit-volume niche with low Chinese/European competition. Ideal for decentralized distribution.

Macro Strategic Conclusion



Venezuela's agricultural sector presents a structural investment opportunity of exceptional scale for Indian industry, articulated around three converging vectors. First, Fedegro confirms that the national machinery fleet has exceeded its useful life, requiring large-scale renewal across all soil zones —a replacement cycle that represents a direct and immediate commercial opening for Indian tractor manufacturers (Sonalika, Mahindra, TAFE), reinforced by the confirmed local assembly precedent with Venequirca—. Second, the chronic diesel scarcity that paralyzed 90% of machinery in the Southern Lake Maracaibo sub-region underscores the strategic relevance of alternative motorization —dual-fuel, CNG, and solar— in which India's industrial and renewable energy ecosystem (Adani Green, Tata Power, ISA) holds a decisive competitive advantage. Third, Venezuela's freshwater endowment is sufficient to double its current agricultural output if channeled through precision irrigation investment, a segment where India's engineering capabilities (drip irrigation, solar pumping) are globally benchmarked and where a 44% market growth rate has already been recorded. Taken together, and segmented by the agromechanical zones identified in this matrix —from heavy-draft tractors in the Llanos to crawler microcultivators in the Andes— the opportunity is not monolithic but regionally differentiated, requiring tailored product and financing solutions per zone. The Embassy recommends prioritizing the Aragua–Carabobo corridor (urgent sugarcane fleet renewal), Southern Lake Maracaibo (alternative motorization), and Lara–Falcón (water infrastructure) as the three highest-priority entry points for Indian commercial capital in the 2025–2026 window.

Sources: Own elaboration, 2026. Based on cross-referenced data from specialized sources in agronomy and edaphology.

Strategic entry and localized operations: Sonalika and Venequirca

Sonalika Tractors (International Tractors Limited) has established itself as the leading brand of Indian tractors in Venezuela. The arrival of the brand in 2014 marked a significant milestone in South-South agricultural cooperation¹⁴⁴. This is explained by the three fundamental pillars that India has perfected: mechanical robustness, fuel efficiency, and economic accessibility¹⁴⁵. A thorough review of its operations confirms that Sonalika operates through an exclusive partnership with Venequirca, C.A. (Venezuelan Irrigation and Agricultural Machinery), a company with more than 35 years of experience in the Venezuelan agricultural sector¹⁴⁶.

The cornerstone of this penetration is the Sonalika Assembly Plant located in the state of Miranda, specifically in the Guatire-Araira Industrial Zone¹⁴⁷. This facility is not simply a distribution point, but a strategic asset that allows for the local integration of machinery, thus reducing import costs and circumventing some of the logistical bottlenecks associated with shipping fully assembled units¹⁴⁸.

¹⁴⁴ <https://sonalikavzla.com/pages/nosotros/> and <https://www.merikheti.com/en/blog/sonalika-vs-new-holland-tractor-comparison>

¹⁴⁵ <https://sonalikavzla.com/pages/nosotros/>

¹⁴⁶ Ibid.

¹⁴⁷ Ibid and <https://venequirca.com/>

¹⁴⁸ <https://svmachineryindia.com/importing-tractors-from-india-to-latin-america/>



Operational metric	Details	Strategic importance
Association	Venequirca, C.A. (Exclusive)	Take advantage of 35 years of local market knowledge.
Assembly Point	Guatire-Araira National Highway, Industrial Zone, Warehouse No. 3, The Rodeo Sector	Local production reduces tariffs and logistics costs.
Red	More than 9 primary points of sale	National reach to the main agricultural states.
Contact Infrastructure	Telephone: +58 (212) 6309000/6309001 Email: atencionalcliente@venequirca.net	It facilitates direct communication between the farmer and the brand.

Source: Prepared by the author using specialized sources in the field¹⁴⁹.

The distribution network established by Venequirca ensures that agricultural producers throughout the country have access to both equipment and after-sales service. In a market where parts shortages have historically been a deterrent to investment in foreign machinery, Venequirca's commitment to providing original spare parts is a decisive competitive advantage¹⁵⁰.

Competitive landscape and market share in Venezuela

Despite the good performance of Indian brands, the Venezuelan tractor market remains very competitive, with China and Brazil as the main alternative sources of supply. In 2024, Venezuela's tractor imports reached the figure of \$32.9 million, making it the 113th largest importer worldwide¹⁵¹.

Origin of Import	Value 2024 (Millions of dollars)	Growth State
China	22.3	Dominant (Growth of +3.31M)

¹⁴⁹ <https://sonalikavzla.com/pages/nosotros/>, <https://venequirca.com/> and <https://venequirca.com/>

¹⁵⁰ <https://venequirca.com/>, <https://www.instagram.com/reel/DSGCOJykdql>

¹⁵¹ <https://oec.world/en/profile/bilateral-product/tractors/reporter/ven>



Brazil	6.55	Regional Leader (Growth of +461k)
India	2.42	High Growth (Growth of +1.79M)
Italy	1.51	Niche Premium
Colombia	0.103	Cross-border trade

Source: OEC Bilateral Trade Data.

Currently, India is the fastest-growing source for tractor imports in Venezuela in terms of percentage growth, almost doubling its footprint between 2023 and 2024¹⁵². This indicates a shifting preference towards Indian "frugal engineering" over some of the lower-cost but potentially less durable Chinese models, and a move towards diversification away from traditional Mercosur suppliers like Brazil. Furthermore, the success of the machinery sector is deeply linked to the bilateral relationship between India and Venezuela. The diplomatic ties, marked by their 66th anniversary in 2025, have evolved from a focus on oil to a multifaceted partnership encompassing energy, health, digital technology, and agriculture¹⁵³.

Trade balance and the dynamics of oil by machinery

Venezuela has become one of India's largest oil suppliers, with companies such as Reliance Industries and ONGC Videsh Limited (OVL) maintaining significant interests in the Orinoco Oil Belt¹⁵⁴. This energy relationship creates a key commercial channel and bilateral trade reached USD 1,175 million in fiscal year 2023-24¹⁵⁵. While most of India's imports from Venezuela consist of crude oil (USD 1,760 million in 2024), Indian exports are mostly value-added products¹⁵⁶.

Main Indian Exports to Venezuela (2024)	Value (Millions of USD)
Packaged Medicines	92.8
Vaccines and Biologicals	14.5
Unglazed Ceramics	13.3

¹⁵² Ibid

¹⁵³ <https://www.manoramayearbook.in/current-affairs/india/2026/01/31/india-venezuela-bilateral-relations.html>

¹⁵⁴ <https://www.strategicfront.org/forums/threads/india-venezuela.2871/>

¹⁵⁵ <https://www.eoicaracas.gov.in/page/india-venezuela-relations/>

¹⁵⁶ https://oec.world/en/profile/bilateral-country/ind/partner/ven?selector2825id=trade_i_baci_a_22

**Machinery and Mechanical Appliances**

Included in secondary categories

Source: OEC Subnational Trade Profiles¹⁵⁷.

The "Machinery and Mechanical Appliances" category is a key component of this set of exports. By providing the necessary tools for agricultural recovery, India is positioning itself as a development partner rather than just a buyer of raw materials. This is supported due to a diplomatic commitment heavy, such as the January 2026 call between Prime Minister Narendra Modi and acting President Delcy Rodríguez, where it was agreed to deepen cooperation in the Global South¹⁵⁸.

Financing mechanisms: Exim Bank and CAF

The entry of capital-intensive equipment – such as tractors – is often complicated by the limited access to credit available to Venezuelan producers. To better address this, India's Export-Import Bank (Exim Bank) has extended several Lines of Credit (LOCs) to partner countries such as Venezuela, specifically for agricultural projects¹⁵⁹. These LOCs include the acquisition of tractors, harvesters and processing equipment, as well as the establishment of assembly plants.

In addition, an agreement between the Andean Development Corporation (CAF) and Exim India established a USD 10 million credit line to provide export financing for products manufactured in India in the region¹⁶⁰. This line of credit is key to managing the exchange rate risks that have affected trade with Venezuela, allowing manufacturers from India to expand their presence with a reduced risk.

Digitization and customized rental models

In India, and is being exported to other developing nations, the "Custom Hiring" model could be highly replicable where, due to high cost of owning a tractor, small farmers are turning to leasing services¹⁶¹. Platforms like Mahindra's "Atmanirbhar Krishi" provide farmers with agricultural information and facilitate the rental of high-capacity equipment¹⁶². At Venezuela, where capital is even scarcer, the establishment of personalized rental centers—such as those funded in India—, could significantly increase mechanization levels¹⁶³.

¹⁵⁷ Ibid.

¹⁵⁸ <https://theindianeye.com/2026/01/31/india-and-venezuela-agree-to-deepen-partnership-across-trade-investment-energy/>

¹⁵⁹ <https://www.eximbankindia.in/lines-of-credit>

¹⁶⁰ <https://www.caf.com/en/currently/news/caf-and-exim-india-sign-credit-line-agreement/>

¹⁶¹ <https://market.us/report/global-agricultural-tractor-market/> and <https://www.techsciresearch.com/report/india-tractor-market/2884.html>

¹⁶² <https://www.techmahindra.com/makers-lab/>

¹⁶³ <https://www.mordorintelligence.com/industry-reports/india-agricultural-machinery-market>



PART V

FINAL CONSIDERATIONS



PART V

FINAL CONSIDERATIONS

Venezuela represents a window of opportunity for Indian-made agricultural machinery, conditioned by the macroeconomic, institutional, and exchange rate complexities that have characterized the country over the last five years. The convergence of factors such as partial economic recovery, the outdated state of the country's machinery fleet, the strengthening of bilateral diplomatic relations, and the strategic positioning of brands like Sonalika (through Venequirca) are key factors to set up a scenario in Venezuelan territory that is favorable for the sustained expansion of Indian exports in this sector.

The Venezuelan economy is undergoing a gradual recovery, the sustainability of which depends heavily on the performance of the hydrocarbons sector and the ongoing institutional reforms. Recent indicators, such as the narrowing exchange rate gap and the appreciation of sovereign and PDVSA bonds, suggest that the market is incorporating positive expectations regarding the reform trajectory. For Indian players in the machinery sector, this implies that the investment recovery outlook, while subject to volatility, appears more predictable than in previous periods. Consequently, country risk assessments must consider both structural risk factors and the ongoing reform dynamics, avoiding static interpretations of a reality in transformation.

That's when, the Venezuela's real, urgent, and geographically diverse demand for agricultural machinery is gaining momentum. The national equipment stock has exceeded its useful life, and the reactivation of strategic crops—corn, rice, sugarcane, plantains, and vegetables—requires a technological upgrade that the country cannot meet with local production alone to reach its full productive potential. This structural dependence on imports represents the main competitive opportunity for Indian manufacturers, whose value proposition based on "frugal engineering"—mechanical robustness, fuel efficiency, and affordability—aligns directly with the soil, financial, and operational conditions and needs of Venezuelan agriculture.

Segmenting demand by region and soil type is fundamental to identifying market niches with high potential for the diversity of Indian tractors, taking advantage of India's global leadership as the world's largest producer and consumer. Specifically, the Llanos (Guárico, Barinas, and Cojedes) require high-powered tractors, agricultural regions like Portuguesa and Zulia need medium-sized equipment, and the Andean Zones (Mérida and Táchira) are geared towards micro-mechanization, using motorized cultivators and mini-tractors with track traction; this regional differentiation is crucial to guide the composition of export portfolios and the distribution strategy, making it imperative to avoid uniform strategies given the marked geographical diversity of the market.

It is important to note that the opportunity is not limited to tractors alone. Irrigation systems—whose market saw 44% growth during the period analyzed—precision seeders, liming machines, and specialized harvesters constitute complementary, high-demand segments that can be served by the Indian manufacturing ecosystem. India, as the world's second-largest producer of agricultural machinery and a leader in solar irrigation and precision pumping solutions, has export



capabilities that far exceed its tractor supply and which have not yet been fully exploited in the Venezuelan market. Currently, there are also no significant competitors in that market.

The Sonalika-Venequirca case demonstrates that the local assembly model, implemented through a partner with in-depth market knowledge, is the most efficient architecture for sustained market penetration in Venezuela. The assembly plant in the Guatire-Araira Industrial Zone not only reduces tariff and logistics costs but also establishes an institutional presence in the host country, facilitating access to government financing programs and the development of after-sales service networks—a critical factor in a market historically hampered by a shortage of spare parts.

In this regard, the replication of this model by other Indian manufacturers, taking advantage of existing financing mechanisms—such as the Export-Import Bank of India's (Exim Bank of India) credit lines for agricultural projects and the current agreement between CAF and Exim India for Indian manufactured exports in the region—is crucial. The coordinated activation of these instruments, in conjunction with the Venezuelan private sector and agricultural institutions, can substantially reduce the barrier to entry that access to credit represents for local producers. Furthermore, in an environment where productive capital is scarce and informality in the agricultural sector is high, equipment leasing through digital platforms or decentralized service centers can multiply the effective reach of Indian machinery, without requiring full purchasing power on the part of the Venezuelan farmer.

In summary, India's distinct competitive advantages materialize along three lines: (i) optimal power and traction range for Venezuela's dual soil-crop conditions; (ii) integration of low-cost technologies (GPS, IoT, dual-fuel/solar engines) that address obsolescence and dependence on diesel; and (iii) export scalability supported by financing and local assembly, enabling rapid capital turnover in short cycles and mitigating the exchange rate gap (reduced to 34.94% in 2026). The revaluation of PDVSA bonds (+30%) and the easing of secondary sanctions create an environment with a lower country risk premium for dividend repatriation.

The Venezuelan market currently presents a strategic and limited window of opportunity (2026-2028) for Indian agricultural machinery. This opportunity is driven by a confluence of key factors: a projected economic and oil recovery, the existence of a pro-investment regulatory framework, and growing unmet global and local demand. Indian tractors are positioning themselves as the ideal strategic partner thanks to the combination of technical capabilities, high-cost competitiveness and great adaptability to the diverse Venezuelan operating conditions. This value proposition allows for a complementary integration that benefits both nations: it accelerates agricultural productivity in Venezuela and consolidates India's presence in the Latin American market. The investment also benefits from a robust institutional support environment, including bilateral financing and high-level diplomatic engagement between the two governments.

Ultimately, the realization of these opportunities will depend on the speed and depth of Venezuelan reforms, the evolution of the foreign exchange market, and the ability of Indian private actors to adapt their offerings to the specific regional characteristics of Venezuelan agriculture. However, for those manufacturers and exporters with a long-term vision, Venezuela is not simply a



destination market: it represents the gateway to the Latin American market for Indian agricultural machinery, at a time when the region demands accessible, robust technological solutions tailored to the scale of small and medium-sized producers.