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Climate Adaptation and Resilience of Iran's Private Sector

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Executive Summary

For Iran's private sector, climate change is no longer merely an environmental concern or an issue confined to the distant future. Rising temperatures, recurrent periods of extreme heat, pressure on water resources, changes in drought patterns and extreme rainfall, and changing coastal conditions can affect production capacity, operating costs, workforce health and productivity, asset values, supply chains, and investment security [14, 15, 20, 23, 24, 25, 26].

Climate impacts in Iran occur against a backdrop of structural and management-related vulnerabilities. Unsustainable groundwater abstraction, the siting of certain water-intensive industries in arid areas, dependence on limited water and energy resources, and vulnerabilities in parts of the country's infrastructure can amplify the economic consequences of climate hazards. It is therefore essential to distinguish climatic hazards from management-related pressures on resources and from enterprises' capacity to adapt [9, 21, 22].

Scientifically, the warming trend in Iran is clearer and more consistent than changes in mean precipitation. A 2026 study based on an ensemble of CMIP6 climate models indicates that projected precipitation changes vary across locations and scenarios. By contrast, higher temperatures and evaporative demand may intensify water stress and drought even in areas without a marked decline in average precipitation [20].

Iran's groundwater crisis illustrates the interaction between climatic pressures and resource management. A nationwide study published in Nature Communications reported a substantial decline in groundwater recharge between 2002 and 2017 and identified unsustainable management of water and environmental resources as the principal driver of this trend, with climatic changes also playing an aggravating role [21].

Land subsidence also poses a serious threat to fixed assets, transmission lines, roads, railways, and long-term investments in susceptible areas. A satellite-based study in 2025 demonstrated the substantial extent of subsidence in Iran. In terms of causal attribution, however, subsidence is primarily associated with aquifer depletion and human groundwater abstraction; it should not be attributed directly to climate change without specific evidence [22].

Extreme heat affects the private sector economically through two principal pathways: first, increased heat stress and occupational health and safety risks; and second, higher cooling requirements and potentially greater pressure on energy supply systems. Managing workplace heat stress should therefore become an integral part of operational risk management and business continuity planning [14, 15, 16].

Climate risks also differ across the country's coastlines. Along the southern coast, extreme water levels resulting from the combination of sea level, tides, waves, and marine storms are a concern. In the Caspian Sea, by contrast, scenarios of falling water levels and shoreline retreat may affect ports, fisheries, and coastal infrastructure. Adaptation measures must therefore be designed according to the location and characteristics of individual assets [24, 25, 26].

Despite these hazards, Iran has practical experience and technological capabilities relevant to adaptation. In parts of the economy, measures to manage water consumption and recycle water, use treated wastewater, protect infrastructure, monitor hazards, and improve safety have been implemented or are under way. Examples such as industrial water-recycling projects and the transfer scheme for treated wastewater in Tabriz to supply major industries demonstrate the potential to translate adaptation needs into concrete technical and economic projects. Nevertheless, the implementation status and quantitative results of each project must be verified separately; not every announced initiative should be described as completed [6, 30, 31].

A central finding of this report is the absence of a publicly available, coherent, and comparable database on the climate preparedness of Iranian enterprises. At present, sufficient data are unavailable to determine how many companies have conducted climate risk assessments, how much has been invested in adaptation, the actual costs of operational interruptions, or the losses avoided through adaptation measures. Closing this gap should be regarded as a priority for private-sector capacity development rather than filling it with statistically unsupported estimates [1, 3].

In policymaking, Iran has relevant legal and institutional foundations. Clause (t) of Article 22 of the country's Seventh Development Plan mandated the preparation of a national climate change management programme, which was approved by the Council of Ministers in October 2025. Its adaptation component covers areas including water, agriculture, health, the environment, and monitoring and early-warning systems, and provides for consideration of public–private partnership arrangements and existing financial support mechanisms for relevant projects [8, 9].

The Foreign Investment Promotion and Protection Act and the Law on Financing Production and Infrastructure also provide frameworks within which foreign investment, financing arrangements, and participation in productive and infrastructure projects can be examined. Any individual project's use of these legal provisions, however, depends on meeting eligibility conditions, obtaining the necessary permits, complying with sector-specific requirements, and the practical feasibility of financial transfers and technological cooperation [28, 29].

Internationally, the adoption of the 59 Belém Adaptation Indicators at COP30, together with ongoing work under the Global Goal on Adaptation, offers a framework for linking national efforts with measurable indicators. These indicators are global in nature, voluntary, non-prescriptive and non-punitive; they must not be presented as a set of national indicators adopted by Iran [10, 11].

At the same time, the readiness initiative supporting the preparation of Iran's National Adaptation Plan, backed by the Green Climate Fund and undertaken in cooperation with the Food and Agriculture Organization of the United Nations, provides an important opportunity to strengthen sectoral planning and stakeholder participation, including that of the private sector. The initiative does not, in itself, constitute the allocation of investment finance to projects proposed by enterprises. Support for readiness and planning must be distinguished from financing for project implementation [12, 32].

In response to the expectations set out in the Iran Chamber's COP31 Action Plan, this report identifies not only climate risks but also a range of cooperation and investment opportunities.

Ten preliminary project concepts have been identified in enterprise risk assessment, industrial estates, water management, climate services, logistics, workforce health, agriculture, subsidence monitoring, insurance, and project preparation. These concepts are not yet approved or fully financed projects. Before they can be presented to investors, further technical, legal, economic, and institutional work will be required [1].

Five areas are recommended for initial prioritisation: an enterprise climate risk assessment tool; industrial water management and recycling; climate risk assessment for industrial estates; the resilience of ports and logistics chains; and a workplace heat-stress management programme.

Opportunities for international cooperation in these areas extend beyond capital mobilisation. Technology transfer and localisation, joint research, engineering services, specialist training, risk mapping, pilot-project design, development of insurance instruments, and joint preparation of investment-ready proposals could also form the basis for cooperation among the Iran Chamber, businesses, research institutions, development organisations, and international partners.

In adaptation finance, Türkiye's Financing Adaptation for Growth project illustrates how enterprise vulnerability assessments can be linked to the identification of investment needs and project preparation to establish a structured adaptation-financing mechanism. This example offers lessons for study and contextual adaptation; it does not imply that Iran has access to a comparable financing channel or can directly use funds allocated to Türkiye [19].

The report recommends that the Iran Chamber gradually develop four complementary capacities in its role as a facilitating institution:

An enterprise climate risk assessment system; a database of losses and adaptation experiences; a pipeline of potentially investable projects; and a sustained cooperation mechanism connecting government, the private sector, research institutions, and technology and capital providers.

The report's central message is that climate resilience is essential to production continuity, investment security, and the sustainability of supply chains in Iran's private sector. Adaptation becomes effective economic policy when climate risk is expressed in terms of assets, production interruptions, productivity, capital, and avoided losses.

Introduction

This report was prepared under the mandate of the Climate Adaptation and Resilience Working Group of the Iran Chamber of Commerce, Industries, Mines and Agriculture, to support the participation of Iran's private sector in COP31. The mandate is established in Section 8-3 of the Comprehensive Action Plan for the Participation of Iran's Private Sector in the Conference, which calls for assessing climate risks to assets and supply chains and identifying adaptation measures, actions undertaken, technology needs, and investment and international cooperation opportunities [1].

The intended audience extends beyond domestic environmental and climate specialists. The document also addresses economic decision-makers, private-sector associations, policymakers, academic institutions, technology companies, financial institutions, and international organisations.

Accordingly, the report addresses three principal questions:

What are the most significant climate risks facing Iran's economy and private sector?

What measures and capacities exist to reduce vulnerability?

What opportunities can be developed for technology, investment, and international cooperation?

The report's analytical approach follows this sequence:

Climate hazard → exposure of assets or activities → vulnerability → operational and economic consequences → adaptation measure → implementable project → measurable outcome

The report draws on scientific research, national policy documents, international frameworks, and published information about relevant capacities and projects. It does not claim to have conducted a comprehensive field assessment of every enterprise in Iran, measured avoided losses nationwide, or established a definitive list of investment-ready projects.

Documented facts and findings drawn from other works are identified by numbered references. By contrast, statements labelled “Working Group Analysis” or “Working Group Recommendation” are this study's expert interpretations or proposed actions and do not necessarily represent direct quotations from a single source.

Chapter One — Foundations, Analytical Framework and Climate Adaptation Policy Context

1-1. Statement of the Problem

Iran's economy is confronting climate change impacts in circumstances where water scarcity, parts of production's dependence on reliable water and energy supplies, the concentration of some industries in water-scarce regions, infrastructure vulnerabilities, and interconnected supply chains already affect economic risk [9, 21].

Consequently, the losses associated with a climate hazard are not determined solely by the hazard's intensity. Two enterprises exposed to similar drought or heat conditions may experience very different consequences because of differences in alternative supplies, water recycling, cooling systems, backup electricity, supply-chain management, and business continuity plans [3, 4].

For an economic decision-maker, the practical question is not simply how much Iran's average temperature may rise by 2050. More pressing questions are whether water can be secured for a long-term investment, how many working days may be constrained by extreme heat, how resilient transport infrastructure is to flooding, and what a suspension of operations would cost the enterprise.

Working Group Analysis: The first step in designing private-sector adaptation is to convert climate data into information that can support economic decision-making.

1-2. Purpose and Scope of the Study

The study aims to identify physical climate risks and their consequences for Iranian enterprises, and to develop a framework for reducing vulnerability.

Seven objectives are pursued:

1. Identify and classify climate risks relevant to the private sector;

2. Explain their effects on production, assets, the workforce, and supply chains;

3. Review examples of measures undertaken and the country's operational and technological capacities;

4. Identify information, management, and technology gaps;

5. Present proposed projects that could be developed into cooperation and investment opportunities;

6. Review the relevant legal and policy frameworks;

7. Identify messages and requests suitable for presentation at COP31.

The report focuses on adaptation to the physical impacts of climate change. Greenhouse gas emissions reduction, carbon policies, and trade mechanisms such as the Carbon Border Adjustment Mechanism (CBAM) are important, but should not be conflated with climate adaptation.

1-3. Concepts of Adaptation and Resilience

Climate adaptation refers to adjustments in human or natural systems in response to actual or expected climatic conditions, aimed at reducing harm or taking advantage of potential opportunities [4, 10].

Climate resilience is a broader concept encompassing a system's capacity to anticipate, withstand, absorb, respond to, recover from, and adapt to climate shocks and stresses [4, 10].

For an enterprise, resilience should address at least three questions:

Have the principal hazards been identified in advance?

Can critical activities continue during disruptions?

Can the time and cost of returning to normal conditions be managed?

Adaptation does not necessarily mean eliminating all risks. Some risks can be reduced, some transferred through insurance or contracts, and some accepted with a clear understanding of their consequences.

1-4. Distinguishing Adaptation from Mitigation of Climate Change

In climate science and policy, “climate change mitigation” refers to human interventions that limit the drivers of climate change by reducing greenhouse gas emissions or enhancing their removal by sinks. “Climate adaptation”, by contrast, refers to measures taken to reduce vulnerability and manage the actual or anticipated consequences of climatic conditions.

It is important to note that “mitigation” has a different meaning in disaster risk management: the reduction or minimisation of the adverse effects of hazards and disasters. Accordingly, wherever “mitigation” is contrasted with “adaptation” in this report, it refers specifically to climate change mitigation as used by the IPCC and UNFCCC.

Thus, cutting greenhouse gas emissions, improving energy efficiency, and increasing carbon sequestration capacity are examples of measures addressing the drivers of climate change; managing water scarcity, strengthening infrastructure, reducing flood vulnerability, and managing workforce heat stress are adaptation measures. Some interventions may deliver both mitigation and adaptation benefits. In other words, mitigation primarily addresses human drivers of climate change, including greenhouse gas emissions, whereas adaptation addresses its actual or expected consequences and reduces systems' vulnerability [4, 10].

Energy efficiency, renewable energy, and methane emissions reductions generally fall under mitigation. Water-scarcity management, infrastructure strengthening, early warning, protection of workers during extreme heat, and insurance against climate risks are examples of adaptation measures.

Some measures deliver co-benefits. Climate-responsive building design, for example, can reduce energy consumption while improving the ability of a building to maintain acceptable operating conditions during periods of extreme heat [7].

1-5. Risk Assessment Framework

In climate risk assessment, three fundamental components are hazard, exposure, and vulnerability. A hazard is a potentially harmful event or trend; exposure refers to the presence of assets, people, or activities in areas affected by a hazard; and vulnerability reflects sensitivity and limited capacity to cope or adapt [4].

At enterprise level, operational and economic consequences must also be assessed separately.

For example:

Drought → water-intensive factory → dependence on a single water source → production constraints → reduced revenue and increased costs.

Or:

Extreme rainfall → warehouse in a flood-prone area → inadequate drainage → inundation → inventory losses and delivery delays.

Working Group Recommendation: Every enterprise climate risk assessment should produce a list of implementable actions and indicators for measuring risk reduction; otherwise, identifying hazards alone will have limited managerial value.

1-6. Methodology and Levels of Evidential Confidence

The report distinguishes three categories of statements:

Observed findings: information recorded through monitoring systems, official statistics, or field measurements;

Model estimates: results contingent on scenarios, modelling assumptions, and time horizons;

Economic inferences: assessments of the potential consequences of scientific findings for assets, production, or investment.

For example, satellite observations of land subsidence are not equivalent to a forecast of future damage to an industrial installation. Estimating possible damage requires site-specific information, asset values, and engineering characteristics [22].

Likewise, a particular flood event should not be directly attributed to human-induced climate change without a dedicated attribution study.

These distinctions are maintained throughout the report.

1-7. Iran's Policy and Legal Framework

1-7-1. The Seventh Development Plan Act

Article 22 of the Islamic Republic of Iran's Seventh Five-Year Development Plan Act, alongside requirements for environmental impact assessment of major projects, provides in clause (t) for a national climate change management programme aimed at developing a green economy and low-carbon industry and strengthening adaptation [9].

For the private sector, this provision is important because it offers a policy basis for connecting development and investment decisions with climate considerations.

Nevertheless, the environmental impact assessment required by law is not necessarily equivalent to project-level climate risk assessment; the two should be treated as complementary.

1-7-2. National Climate Change Management Programme

The National Climate Change Management Programme was approved by the Council of Ministers on 12 October 2025 (20 Mehr 1404) and formally issued on 20 October 2025 (28 Mehr 1404). Its adaptation component covers water, agriculture, health, the environment, and monitoring and forecasting [8].

In addition to strengthening the capacity of executive agencies, the programme addresses the facilitation of support, capacity-building, and climate technology transfer. It also provides for implementing operational projects using approved appropriations, public–private partnership mechanisms, and existing financial incentives [8].

These provisions can help identify potential channels for cooperation. Nonetheless, each project requires a specific assessment of the responsible authority, necessary permits, financing arrangements, and implementation conditions.

1-7-3. Foreign Investment Promotion and Protection Act

Foreign Investment Promotion and Protection Act

The Foreign Investment Promotion and Protection Act (FIPPA) provides Iran's principal legal framework for admitting and protecting authorised foreign investment. It provides for the admission of direct investment and investments under permitted contractual arrangements [28].

For adaptation projects, including water-recycling facilities, industrial infrastructure, technical services, and certain technology systems, assessing the applicability of this framework could form part of the project's legal due diligence.

However, the existence of a foreign investment law does not itself constitute project approval, guarantee the transfer of funds, or ensure the feasibility of cooperation with any particular foreign investor. Legal restrictions, sector-specific regulations, the status of investment permits, and the practical requirements of financial and technological transactions must be assessed case by case.

1-7-4. Law on Financing Production and Infrastructure

The Law on Financing Production and Infrastructure, adopted in Iranian year 1402 (2023–2024), provides instruments for financing, partnerships, infrastructure development, and consideration of foreign financing. Projects involving water supply and conveyance, wastewater treatment, and production or service infrastructure may be assessed under its applicable provisions [29].

Public–private partnership contracts, including arrangements such as build–operate–transfer (BOT), may be considered for some adaptation-related infrastructure projects. The appropriate contractual model, however, must reflect asset ownership, revenue streams, risk allocation, and implementing regulations [29].

Working Group Recommendation: A preliminary legal assessment should be prepared for each priority adaptation project, identifying the permitting pathway, competent authority, potential for private-sector participation, restrictions on foreign capital, and the parties' respective responsibilities.

1-8. International Adaptation Framework

1-8-1. Global Goal on Adaptation

Article 7 of the Paris Agreement establishes the Global Goal on Adaptation, centred on enhancing adaptive capacity, strengthening resilience, and reducing vulnerability to climate change [10].

The UAE Framework for Global Climate Resilience, adopted at COP28, sets out thematic and process-oriented adaptation targets in fields such as water, food and agriculture, health, ecosystems, infrastructure, livelihoods, and the stages of adaptation planning and monitoring [10].

1-8-2. Belém Adaptation Indicators

At COP30 in 2025, Parties to the Paris Agreement, meeting as CMA 7, adopted 59 global Belém Adaptation Indicators. The indicators are voluntary, facilitative and non-punitive, with due regard for national circumstances; they must neither be used for punitive comparisons among countries nor create barriers to developing countries' access to finance [10, 11].

Parts of this framework relate to private-sector priorities, including water efficiency, adaptation technologies, warning systems, capacity-building, finance, and the assessment of adaptation outcomes.

Working Group Recommendation: Rather than applying all global indicators directly and without adjustment, a selected set suited to Iranian private-sector circumstances should be developed and complemented by enterprise-level operational and economic indicators.

1-8-3. Iran's National Adaptation Plan

In 2025, a GCF-supported readiness programme delivered by FAO was approved to help prepare Iran's National Adaptation Plan (NAP). It covers sectoral adaptation planning in water, food and agriculture, energy, health and disaster risk management, and envisages private-sector participation [12].

A further readiness initiative to strengthen Iran's access to GCF resources, institutional capacity, appropriate technologies, and a pipeline of climate projects is also recorded in the Fund's official documents [32].

These capacities provide an opportunity for the Iran Chamber to propose cooperation. Formal participation and access to project resources nevertheless require separate procedures and approvals.

1-8-4. Relevance to COP31

COP31 provides an opportunity to present the agenda of Iran's private sector on climate risk management, technological cooperation, capacity-building, project preparation, and adaptation investment.

Working Group Analysis: International engagement is more effective when general requests are backed by assessable proposals, identifiable partners, technology needs and projects with outcome indicators.

Chapter Two — Climate Risk and Vulnerability Profile of Iran's Private Sector

2-1. Warming: The Underlying Climate Trend

Rising temperatures are among the clearest signals of climate change in Iran. CMIP6-based analyses indicate greater confidence in the direction of projected temperature change than in changes in mean precipitation, although the magnitude of warming depends on the scenario, region, and time horizon [20].

For economic activities, rising temperatures do more than increase cooling demand. Higher evaporative demand, greater crop water requirements, workforce heat stress, changes in equipment operating conditions, and increasing pressure on water and energy supply infrastructure are among the pathways through which warming exerts its effects [15, 16, 20].

For long-term investments, relying exclusively on historical average climatic conditions may result in an inadequate assessment of risk.

Working Group Recommendation: Climate scenarios appropriate to the location and expected service life of long-lived projects—including water-intensive industries, power plants, transport infrastructure, and coastal facilities—should be examined during feasibility assessment.

2-2. Water Resources: A Structural Risk to Production and Investment

Water risk affects businesses through multiple pathways: reduced availability, increased supply costs, changes in quality, abstraction restrictions, greater treatment needs, difficulty expanding production capacity, and increasing reliance on alternative sources.

In Iran, water-related climate hazards are intertwined with resource management problems. Scientific evidence indicates that a substantial share of groundwater depletion is associated with excessive abstraction and unsustainable management, while climatic changes can intensify this pressure [21].

This distinction is crucial to selecting appropriate responses. Attributing the water crisis solely to climate change risks overlooking opportunities to reduce vulnerability through demand management, recycling, loss reduction, and better investment decisions.

Five indicators are proposed for assessing a water-intensive enterprise:

1. Freshwater consumption per unit of output;

2. The proportion of water recycled within the process;

3. Dependence on a single supply source;

4. The duration for which restricted or interrupted water supply can be tolerated;

5. Water supply costs under alternative scenarios.

These indicators could provide a basis for cooperation among industrial enterprises, water-engineering companies, equipment suppliers, financial institutions, and research organisations.

2-2-1. Existing Experience in Water Management and Recycling

In Iran, measures with adaptation benefits have been undertaken to reduce raw-water abstraction, recycle industrial wastewater, and use municipal wastewater to supply industries. Many have been introduced as water-resource management or industrial-efficiency measures rather than explicitly reported as climate adaptation projects.

One illustrative example is the project to transfer treated wastewater in Tabriz to meet the water needs of major industries in the city. A report published in 2025 described the provision of part of the necessary operating infrastructure and the continued implementation of the project. Another report, published in Shahrivar 1404 (August–September 2025), stated that the wastewater transfer project serving the Tabriz petrochemical complex and refinery was more than 90% complete. In the absence of formal handover records and final operational data, it is more accurate to describe this as a project under implementation and nearing completion [30, 31].

Experience with wastewater reuse within industrial complexes also suggests that some of the necessary technologies and operating expertise are available domestically, although actual water savings and vulnerability reductions must be measured separately for each facility [30].

Working Group Analysis: These experiences could underpin cooperation on advanced treatment, water-quality management, improved energy efficiency in recycling systems, metering equipment, and financing projects that reduce dependence on freshwater.

2-3. Agriculture, Food Security and Value Chains

Agriculture accounts for a major share of Iran's water withdrawals and faces pressure from drought, rising temperatures, changes in growing conditions, and fluctuating water availability. In its activities relating to Iran, FAO has emphasised climate-resilient agriculture, more efficient water-use practices, resistant crop varieties, and technical capacity development [17].

For the private sector, agricultural risk does not end at the farm gate. Fluctuations in crop yields or quality can affect food processing, cold storage, packaging, transport, exports, and supply contracts.

Agricultural adaptation programmes should therefore address not only water efficiency and appropriate crop varieties, but also climate services, reduced post-harvest losses, flexible contracting, insurance, and supply-chain resilience.

Cooperation Potential: Collaboration between Iranian and international research centres on climate-adapted varieties, precision irrigation technologies, soil-moisture sensors, seasonal forecasting, and decision-support systems for farm and supply-chain management.

Proposed Indicators: Water productivity, yield stability, area under climate-adapted management practices, reduced losses, and reduced interruptions in raw-material supply.

2-4. Land Subsidence: A Threat to Assets and Fixed Capital

Land subsidence is a significant hazard for infrastructure and fixed assets in susceptible areas of Iran. A nationwide 2025 study based on Sentinel-1 satellite observations identified

more than 31,000 square kilometres of land experiencing subsidence rates exceeding 10 millimetres per year [22].

Potential economic consequences include damage to foundations and structures, pipeline failures, disruption of roads and railways, damage to water and wastewater networks, higher maintenance costs, and shortened asset lifespans.

However, subsidence should not be regarded wholly or directly as an impact of climate change. Groundwater abstraction and declining aquifer pressure are among its primary drivers; drought may aggravate the process in some circumstances [22].

Risk reduction requires combining satellite observations, groundwater-level monitoring, geological information, and the locations of economic assets.

Cooperation Potential: Development of land-deformation and subsidence monitoring systems using interferometric synthetic aperture radar (InSAR), surveying and ground-deformation analysis, asset risk assessment, infrastructure monitoring design, and preventive engineering services.

2-5. Extreme Heat, Workforce Health and Productivity

Extreme heat can affect workers' health, safety, and capacity to work. In its 2024 publications, the International Labour Organization identified heat stress as a major occupational safety and health risk in the context of climate change [15, 16].

This hazard is particularly relevant to mining, construction, agriculture, ports, oil and gas, utility-network maintenance, transport, and industries with hot working environments.

Enterprise vulnerability may manifest as greater fatigue, reduced attention, increased accident risks, lower productivity, or restrictions on working hours.

Proposed Practical Action: Design a workplace heat-stress management programme incorporating monitoring, action thresholds, shift adjustments, drinking water and rest breaks, ventilation and shade, worker training, and instructions to suspend work under hazardous conditions.

Cooperation Potential: Occupational health, safety and environment (HSE) services, heat-stress monitoring equipment, specialist training, workplace design, and warning systems linked to operating procedures.

Outcome Indicators: Worker coverage, heat-related illness or injury incidents, working hours lost, and response times to warnings.

2-6. Extreme Rainfall and Flooding

Drought and flooding are not mutually exclusive. A catchment may face an annual water deficit while also experiencing intense rainfall and flood flows over short periods.

A study of 576 Iranian catchments examined changes in selected indicators of extreme events and daily flows under future scenarios and projected increases in some of those indicators in certain catchments. The results depend on the scenario and catchment location [23].

The 2019 floods (Iranian calendar year 1398) illustrate the extent to which Iran's economy and infrastructure are exposed to extreme events. The post-disaster needs assessment conducted by the United Nations and the Government of Iran documented substantial economic losses across sectors. Without an independent attribution study, this particular event should not be attributed directly to human-induced climate change [27].

For the private sector, flood losses may involve physical asset damage, loss of access, disruptions to energy and communications, interrupted supply chains, and higher recovery costs.

Cooperation Potential: Flood-risk mapping, drainage design and improvements, resilience standards, impact-based warning systems, and business continuity planning.

2-7. Dust Storms and Economic Activity

Dust storms have multiple causes and are influenced by natural conditions, drought, land degradation, water management, and domestic and transboundary factors. UNDP publications also highlight their environmental and economic dimensions in Iran [18].

For businesses, dust storms may reduce visibility, disrupt transport, delay flights, increase maintenance requirements, clog filters, accelerate equipment wear, limit outdoor operations, and harm workforce health.

Working Group Analysis: Businesses need more than information on the likelihood of a dust event. Meteorological data should be translated into impact-based warnings that establish when operations should be suspended, transport routes changed, or maintenance measures undertaken. There is scope for cooperation with climate-service providers, forecasting centres, warning-system developers, and insurers.

2-8. Industrial and Logistics Infrastructure

Ports, railways, airports, roads, warehouses, transmission lines, and industrial estates are long-lived assets. Their design and operation should therefore account not only for historical conditions but also for a range of plausible future climatic conditions.

Three complementary areas of action are proposed to strengthen resilience:

First, revise climate-responsive design criteria;

Second, expand monitoring and warning systems;

Third, strengthen preventive maintenance, alternative routes, and recovery plans.

Cooperation Potential: Engineering services, risk-assessment software, structural health monitoring, sensor technologies, resilient infrastructure design, and pilot projects in ports and industrial estates.

2-9. Southern Coasts: Coastal Flooding and Industrial Facilities

The Persian Gulf coast hosts important energy infrastructure, ports, terminals, and industrial facilities.

Studies concerning the northern Persian Gulf indicate that under specified scenarios, the combined effects of rising water levels, tides, waves, and marine storms could increase

coastal inundation risks. Risk assessment should consequently focus on extreme water levels and local conditions rather than average sea-level rise alone [26].

Working Group Recommendation: For ports and major coastal facilities, priority should be given to risk assessments that consider asset service life, extreme water levels, land access, electricity supply, and emergency systems.

2-10. Northern Coasts: Declining Caspian Sea Levels

Owing to its hydrological characteristics and enclosed basin, the Caspian Sea faces a different challenge. Climate studies have projected potentially substantial declines in its water level under various scenarios, while more recent research has investigated the possible implications of shoreline retreat for ports, fisheries, ecosystems, and infrastructure [24, 25].

Accordingly, adaptation on the northern coast must be tailored to reduced water depths, shifts in the shoreline, dredging costs, facility locations, and access to water.

Cooperation Potential: Water-level and shoreline modelling, hydrological monitoring, assessments of port accessibility, and redesign of vulnerable infrastructure.

2-11. Cascading Risks and Supply Chains

Enterprises are seldom exposed to only one independent hazard. Disruption in one area can create economic consequences elsewhere.

For example, extreme heat may raise cooling requirements and, where electricity supply is constrained, increase the risk of production stoppages. Drought can intensify land-subsidence risks by increasing pressure on groundwater resources. Flooding may interrupt raw-material deliveries by severing access roads without entering the factory itself.

Working Group Recommendation: Enterprise risk assessments should cover not only separate hazards but also interdependencies among water, energy, suppliers, transport, labour, and markets.

2-12. Preliminary Risk Matrix

The evidence reviewed suggests that water and heat risks affect a broad range of economic activities; land subsidence and coastal change can be particularly significant for fixed assets in specific areas; and floods and dust storms can affect enterprises through direct damage or operational disruption.

The matrix developed for this study is nevertheless a preliminary expert screening tool, not a definitive quantitative ranking of national risks.

A robust ranking would require detailed data on hazard intensity, the value of exposed assets, vulnerability, and adaptive capacity.

2-13. Private-Sector Preparedness and the Information Gap

One of the study's most important findings is the limited availability of comparable data on the climate preparedness of Iranian enterprises.

There are currently insufficient public data to answer questions such as: How many companies have conducted climate risk assessments? How many have climate-informed business continuity plans? What are the actual losses from climate hazards? How much has been invested in adaptation, and what results have those investments achieved?

The absence of these data does not mean that adaptation measures are absent in Iran; rather, it indicates that many existing activities have not been identified, recorded, and evaluated consistently.

Working Group Recommendation: With the participation of business associations and volunteer enterprises, the Iran Chamber should establish a database of adaptation measures, losses, operational interruptions, and project results. It must distinguish completed actions, projects under implementation, and proposed initiatives.

2-14. Overview of Existing Measures and Capacities in Iran

The review indicates that Iran has implementation experience, scientific capacities, or relevant institutional frameworks in certain areas of adaptation. These capacities, however, have not reached the same level of maturity across all sectors.

Water and Industry: Water-consumption reduction and wastewater reuse projects in certain industrial complexes, as well as initiatives to supply industry with treated wastewater, including the Tabriz example [30, 31].

Agriculture: Activities and programmes in resilient agriculture, water productivity, resistant crops, and improved technical practices, including cooperation reported by FAO [17].

Data and Monitoring: Scientific and technical capacity to use climate models, satellite observations, weather forecasting, and subsidence monitoring, alongside a need to develop practical services for enterprises [4, 20, 22].

Policy and Planning: Adoption of the National Climate Change Management Programme and an internationally supported NAP readiness initiative [8, 12].

Infrastructure and Safety: Dispersed measures in design, operations management, occupational safety, and business continuity that could be classified and assessed from an adaptation perspective [4, 5, 6, 7].

At this stage, no credible nationwide figure can be reported for investment in these measures or the losses they have avoided.

Expert Conclusion: When presenting the country's actual capacities to international audiences, their stage of maturity must be clear: which experiences have been implemented, which projects are nearing completion, which institutional capacities exist, and which items remain proposals for cooperation.

Chapter Three — Pathways for Action, Technology, Investment and Adaptation Projects

3-1. Principles for Adaptation Decision-Making

Adaptation investments should reduce identifiable and measurable risks. Labelling a project “green”, “sustainable”, or “resilient” is not sufficient evidence that it constitutes an adaptation intervention.

Working Group Recommendation: Adaptation measures should be selected according to six principles.

1. Risk-based approach: Identify the target hazard, exposed asset, and economic consequence.

2. Priority to low-regret measures: Prefer actions that remain beneficial under different climate scenarios, such as reducing water losses, preventive maintenance, business continuity planning, and developing alternative supply routes.

3. Flexibility: Long-lived investments should remain capable of modification and upgrading as future conditions evolve.

4. Economic justification: Assess the cost of an intervention against expected losses, interruption costs, and the value of avoided damage.

5. Measurability: Define outcome indicators and a monitoring method for every action.

6. Avoid maladaptation: An intervention must not merely transfer risk from an enterprise to a community, watershed, or another economic sector.

3-2. Managing Water Risk in Industry and Agriculture

For medium-sized and large industries, water risk assessment must go beyond calculating annual consumption and address supply reliability, required water quality, recycling potential, alternative sources, abstraction-restriction scenarios, and the costs of production interruptions.

Water recycling and wastewater reuse can reduce dependence on freshwater in many activities. Technology selection, however, must consider influent and effluent quality, energy consumption, chemical and consumable costs, waste management, and economic feasibility.

In agriculture, options include precision irrigation, resistant varieties, crop diversification, seasonal forecasting, soil-moisture management, insurance, and reduced post-harvest losses [17].

Cooperation Opportunity: Joint water audits, design and operation of recycling systems, technology and know-how transfer, development of monitoring tools, and investment in reducing industrial reliance on freshwater resources.

3-3. Resilience of Industrial and Logistics Infrastructure

Three complementary packages of measures are proposed to strengthen infrastructure resilience.

Review design standards for heat, extreme precipitation, flooding, changing coastal conditions, and land subsidence;

Establish monitoring, forecasting, and warning systems;

Strengthen operational continuity, preventive maintenance, critical inventories, and alternative routes.

The framework may be applied to port projects, industrial estates, transmission lines, transport terminals, and long-lived industrial facilities.

Cooperation Opportunity: Consulting and engineering, structural monitoring, investment risk assessment, resilient infrastructure design, and technology transfer relating to climate-responsive design standards.

3-4. Supply Chains and Business Continuity

Assessing enterprise resilience must not be confined to buildings and equipment within the site boundary.

The full supply chain—from raw-material procurement through transport, warehousing, production, workforce availability, distribution, ports or border crossings, and the customer—should be examined. At each link, it is necessary to identify critical suppliers, single-source dependencies, available alternative routes, the number of days covered by critical inventories, and the maximum tolerable duration of an interruption.

Working Group Recommendation: Develop a standard supply-chain resilience assessment template for selected companies, with potential participation by industrial associations and international specialist-service firms.

3-5. Occupational Health, Safety and Workplace Heat

Workplace heat management should progress from general advice to an operational programme based on monitoring, action thresholds, and outcome assessment.

The programme may include heat-stress monitoring, shift adjustments, breaks, drinking water and electrolytes, ventilation, shade, training, protection of vulnerable groups, and procedures for suspending work under hazardous conditions [15, 16].

Cooperation Opportunity: Development of monitoring tools, climate-informed HSE training, pilot programmes in mines, ports and outdoor industries, and operational guidelines adapted to local conditions.

3-6. Climate Services and Impact-Based Warning Systems

Climate services create economic value for enterprises when they translate scientific information into operational decisions.

For example, an extreme-heat warning should inform decisions on shifts and worker protection; a flood warning should trigger measures relating to warehouses, equipment, or

transport routes; and a dust-storm warning should guide operational and maintenance planning.

Cooperation Opportunity: Software and decision-support systems, integration of weather data into enterprise processes, response protocols, and monitoring of the economic effects of warnings.

3-7. Insurance and Risk Transfer

Not all climate risks can be eliminated through engineering or management measures. Some residual risk can be managed through insurance, contracts, financial reserves, or other risk-transfer instruments.

Proposed cooperation areas include business-interruption insurance, flood insurance, agricultural insurance products, parametric (index-based) insurance, cover for assets exposed to subsidence, and the use of hazard data in pricing.

Working Group Recommendation: A joint study by the Iran Chamber, the insurance industry, and specialist institutions to identify gaps between enterprises' actual risks and available coverage.

3-8. Buildings and the Built Environment

Building adaptation involves reducing sensitivity to heat, rainfall, and flooding, while also reducing dependence on water and energy during periods of stress.

Climate-responsive building envelopes, appropriate ventilation, cooling-load management, effective drainage, and protection of critical equipment can help reduce the vulnerability of industrial and commercial buildings [7].

3-9. Priority Technology Needs of Iran's Private Sector

The assessment of climate risks and adaptation options suggests that private-sector technology requirements fall into several categories.

3-9-1. Water Management and Recycling Technologies

Relevant technologies include metering and smart consumption management, leak detection, industrial wastewater treatment and recycling, advanced treatment suited to required water quality, energy management for treatment systems, and water risk assessment tools.

Economic Application: Reducing freshwater dependence and increasing the reliability of industrial water supply.

Cooperation Area: Technology and know-how transfer, joint equipment design and manufacturing, operational training, and pilot implementation.

3-9-2. Climate Monitoring and Warning Technologies

Needs include geospatial and climate data, local forecasting systems, multi-hazard early warning, exposure-analysis software, tools that link warnings to operational decisions, and systems for recording losses and interruptions.

Economic Application: Extending preparedness time, reducing downtime, and improving operational decision-making.

Cooperation Area: Software services, authorised data access, modelling training, and design of impact-based warning systems.

3-9-3. Climate-Adapted Agricultural Technologies

Required technologies include soil-moisture sensors, precision irrigation, decision support for crop choice and irrigation timing, resistant varieties, post-harvest management, and applied forecasting systems [17].

Economic Application: Improving resource productivity and the resilience of agricultural supply chains.

Cooperation Area: Joint research, technology development, field trials, and producer training.

3-9-4. Infrastructure and Subsidence Monitoring Technologies

Required capacities include satellite-image analysis and InSAR, ground-deformation measurement, structural health sensors, flood modelling, and fixed-asset risk analysis.

Economic Application: Reducing unexpected damage risks and improving decisions on siting, repair, and maintenance.

Cooperation Area: Specialist engineering services, joint research, analytical software, and technology transfer.

3-9-5. Technologies and Tools for Managing Workplace Heat

Heat-stress monitoring systems, worker alert tools, ventilation and localised cooling solutions, and safety-management software may form part of enterprises' technology needs.

Economic Application: Protecting worker health, reducing operational disruption, and supporting productivity.

Cooperation Area: Joint pilot design, HSE training, and equipment effectiveness assessment.

3-9-6. Risk Assessment and Adaptation Planning Tools

Enterprises need simple, standardised tools for identifying hazards, assessing vulnerability, recording losses, developing business continuity plans, and identifying priority projects.

Economic Application: Translating technical information into investment decisions.

Cooperation Area: Joint tool development, software development, training, and consulting services.

Summary of Technology Needs: For international audiences, each cooperation proposal should specify four elements: the enterprise's particular problem, the required technology or knowledge, the proposed form of cooperation, and the measurable outcome. This classification is the Working Group's analytical proposal.

3-10. Adaptation Finance and Conditions for Mobilising Capital

According to UNEP's 2025 Adaptation Gap Report, developing countries' annual adaptation finance needs for 2035 are estimated at approximately USD 310–365 billion, depending on the estimation method. By contrast, international public adaptation finance flows in 2023 amounted to approximately USD 26 billion. These figures relate to different time periods and methods and are presented to illustrate the scale of the financing gap [13].

For Iran's private sector, the central message is that the existence of a climate-related need is not, in itself, sufficient to attract investment.

At a minimum, a proposed project should clearly identify the problem, target hazard, location and beneficiaries, technical solution, estimated capital and operating expenditures, implementation model, outcome indicators, and monitoring arrangements.

It should also explain whether the project is to be financed through direct revenues, cost savings, service-purchase contracts, public–private partnerships, or a combination of sources.

Working Group Analysis: Some adaptation projects may generate limited direct financial returns but still offer considerable economic value by reducing losses or production interruptions. In such cases, the financial return to an investor must be distinguished from the project's wider economic and social benefits.

3-11. Legal and Operational Framework for Foreign Participation

Providing an international audience with a list of laws is not sufficient to present investment opportunities. The relevance of each law to the proposed form of cooperation must be explained.

A. Direct or Contractual Investment

The Foreign Investment Promotion and Protection Act provides a basis for assessing the possible admission and legal protection of authorised foreign investments [28].

Industrial and service-sector adaptation projects may be considered under the Act where eligibility conditions are met, provided that the type of activity, permitted forms and limits of participation, and required approvals are established for each project.

B. Participation in Infrastructure Projects

The Law on Financing Production and Infrastructure allows partnership models to be considered for certain production and infrastructure projects [29].

Depending on their characteristics and ownership arrangements, projects such as water treatment and recycling, shared industrial infrastructure, or certain infrastructure services may be assessed for suitable partnership structures.

C. Technological Cooperation and Engineering Services

Not all cooperation requires foreign direct investment. Technical-service contracts, training, knowledge transfer, joint research, equipment supply, software development, and pilot implementation are also potential cooperation pathways.

Selecting any pathway requires reviewing domestic regulations, intellectual property rights, technology import and export requirements, necessary permits, and contractual or financial restrictions.

D. Practical Feasibility Conditions

Potential obstacles relating to banking transactions, transfers of funds, insurance, equipment procurement, technology export authorisations, and other legal restrictions must be assessed separately for each partner and project.

Accordingly, none of the projects in this report should be presented as having a confirmed foreign investor or final approval unless verifiable supporting documents are available.

3-12. An International Case for Consideration: Türkiye

The Financing Adaptation for Growth project in Türkiye demonstrates a possible connection between enterprise climate risk assessment, identification of investment needs, and the establishment of financing mechanisms.

In 2025, the World Bank approved a guarantee of up to EUR 360 million to support the mobilisation of up to EUR 600 million in commercial financing under this framework. One component involves assessing companies' vulnerability and identifying their adaptation needs [19].

The relevance of this experience for Iran lies not in direct access to the same funding, but in its underlying sequence:

Enterprise climate risk assessment → identification of adaptation needs → project development → review of the financing model

Working Group Recommendation: This sequence should first be tested through pilot activities in selected enterprises or industrial estates.

3-13. Proposed Portfolio of Private-Sector Adaptation Projects in Iran

The report introduces ten preliminary project concepts as areas that could be developed into cooperation opportunities.

All the concepts below remain at the “initial proposal” stage and require technical, economic, operational, and legal assessment before being presented as investment-ready projects.

Project 1 — Enterprise Climate Risk and Adaptation Assessment Toolkit

Proposed English Title: Iran Private Sector Climate Adaptation Toolkit

Objective: Establish a standard, practical method for assessing climate risks, vulnerabilities, and action priorities in business enterprises.

Proposed deliverables include a risk questionnaire, assessment methodology, supply-chain checklist, business continuity plan template, and enterprise risk profile.

International cooperation could involve joint methodology design, software development, training, and pilot implementation.

Outcome Indicators: Number of enterprises assessed, priority risks identified, and actions initiated.

Project 2 — Climate Risk Assessment of Industrial Estates

Objective: Identify shared risks relating to water, flooding, heat, subsidence, electricity, and dust storms among enterprises located in an industrial estate.

Proposed deliverables include a risk map, an inventory of sensitive infrastructure, joint measures, and a response and recovery plan.

International Cooperation: Technical services, modelling, shared-infrastructure management, and investment planning.

Outcome Indicators: Number of enterprises covered, value of assessed assets, and number of joint measures implemented.

Project 3 — Smart and Circular Water Management in Selected Industries

Objective: Reduce water-intensive enterprises' dependence on freshwater resources.

Potential components include water-use audits, accurate measurement, recycling, treated wastewater reuse, process improvements, and demand management.

International Cooperation: Engineering services, treatment equipment, technical know-how transfer, and investment participation.

Outcome Indicators: Freshwater use per unit of output, share of recycled water, and reduction in downtime caused by water-supply constraints.

Project 4 — Climate Services and Warning System for the Private Sector

Objective: Translate meteorological and climate information into usable warnings and operational decisions for enterprises.

Potential pilots could be implemented in industrial estates, ports, mines, or agricultural supply chains.

International Cooperation: Data, modelling, software design, and user training.

Outcome Indicators: Response times, number of enterprises covered, and preventive actions triggered by warnings.

Project 5 — Resilience of Ports and Logistics Corridors

Objective: Reduce damage and interruptions to trade and transport under extreme climatic conditions.

Potential components include assessments of flooding and extreme water levels, land access, heat, dust storms, drainage, and operational continuity plans.

International Cooperation: Port engineering, risk modelling, infrastructure monitoring, and recovery-plan design.

Outcome Indicators: Service levels that can be maintained under extreme conditions and recovery times following disruptions.

Project 6 — Workplace Heat-Stress Management

Objective: Protect worker health while maintaining continuity of economic activity.

A proposed pilot could be implemented in a mine, construction site, port, or outdoor industry.

International Cooperation: Training, monitoring equipment, HSE services, and effectiveness assessment.

Outcome Indicators: Worker coverage, working hours lost, and heat-related incidents.

Project 7 — Climate-Smart Agriculture in a Selected Value Chain

Objective: Increase resilience from farm to industry and market.

Potential components include water-use efficiency, climate-adapted varieties, climate services, loss reduction, insurance, and flexible supply contracts.

International Cooperation: Joint research, technology transfer, climate-service development, and value-chain pilots.

Outcome Indicators: Water productivity, supply stability, and reductions in damage and losses.

Project 8 — Subsidence Monitoring and Infrastructure Risk

Objective: Integrate land-deformation data with information on economic and infrastructure assets.

Proposed deliverables include a map of sensitive locations and a list of assets requiring further assessment or preventive action.

International Cooperation: InSAR technology, remote-sensing services, modelling, and infrastructure engineering.

Outcome Indicators: Value of assets assessed and number of preventive measures undertaken.

Project 9 — Climate Risk Insurance and Risk Transfer

Objective: Assess the gap between enterprises' actual risks and existing insurance cover.

Potential study components include business-interruption insurance, parametric products, property cover in high-risk areas, and the use of climate data in pricing.

International Cooperation: Research and product design, specialised training, and feasibility assessments for insurance pilots.

Project 10 — Adaptation Project Preparation Mechanism

Proposed English Title: Adaptation Project Preparation Facility

Objective: Develop preliminary adaptation concepts into projects supported by sufficiently detailed technical and financial information for investor assessment.

Expected deliverables for each project include a technical project brief, capital and operating costs, financial model, outcome indicators, feasibility study, permitting status, and potential technology partner.

This mechanism could bridge Working Group studies, enterprise needs, and financing opportunities.

3-14. Five Priorities for Presentation at COP31

Of the ten concepts above, the report recommends concentrating initially on five areas:

Priority	Area	Rationale
1	Enterprise climate risk assessment toolkit	Scalable and establishes a common assessment language
2	Industrial water management	Immediate risk and existing domestic experience
3	Climate risk assessment of an industrial estate	Enables pilots and groups enterprises
4	Port and logistics resilience	Direct relevance to trade and investment
5	Workplace heat-stress management	Potential for rapid action and measurable outcomes

Before being formally presented to investors or foreign partners, each priority area should have, at a minimum, a preliminary project concept note.

3-15. Proposed Mechanism for Cooperation with International Partners

To translate broad opportunities into meaningful negotiations, four pathways of cooperation are proposed:

Pathway 1 — Scientific and Specialist Cooperation: Risk assessments, modelling, training, methodology exchange, and indicator development.

Pathway 2 — Technological Cooperation: Technical know-how transfer, joint equipment and software design, localisation, and operational training.

Pathway 3 — Project-Based Cooperation: Joint pilots in identified enterprises or industrial estates, with a designated implementer and outcome indicators.

Pathway 4 — Financial Cooperation: Assessment of direct investment, project partnerships, service contracts, guarantees, and other permitted and practically feasible mechanisms.

These pathways are not necessarily equally feasible. Selection should be accompanied by legal, technical, financial, and operational due diligence for each proposed collaboration.

Working Group Operational Recommendation: Prepare an English-language information package for priority projects, describing the problem, location, beneficiaries, technology, readiness status, expected form of cooperation, and official contact details of the responsible institution.

Chapter Four — Governance, the Role of the Iran Chamber, and Messages for COP31

4-1. The Iran Chamber's Role in Climate Adaptation

The Iran Chamber is not directly responsible for meteorology, water-resource management, environmental protection, or disaster management. Its institutional advantage lies in its access to networks of enterprises and business associations, and its ability to connect private-sector needs with scientific, technical, operational, and financial capacities.

Accordingly, six complementary roles are proposed for the Iran Chamber:

1. Collecting data and actual experiences from enterprises;

2. Translating climate information into economic concepts and indicators;

3. Expanding specialist training and capacity-building;

4. Facilitating project development, access to technology, and cooperation opportunities;

5. Supporting institutional dialogue between government and the private sector;

6. Representing private-sector perspectives and requests in international processes.

These roles are consistent with the direction of the Iran Chamber's earlier document on private-sector participation in adaptation [3].

4-2. A Proposed Standing Mechanism for Following Up on Adaptation

To sustain activities beyond COP31, the Iran Chamber should consider establishing a streamlined specialist coordination mechanism. This need not entail the creation of a new administrative organisation.

Proposed functions include maintaining a climate-risk and loss database, coordinating assessments, developing the enterprise assessment toolkit, following up priority projects, engaging with research institutions and competent government agencies, building capacity, and publishing periodic reports.

Working Group Recommendation: Assign clear institutional responsibility for following up the report and projects, supported by an annual work plan and performance indicators.

4-3. Establishing a Database of Losses and Adaptation Measures

One of the Chamber's initial practical steps could be to design a standard data-collection form for voluntary participation by enterprises.

The minimum dataset should capture hazard type, event date and location, affected asset or activity, interruption duration, direct damage, downtime costs, supply-chain impacts, measures undertaken, costs of those measures, and observed outcomes.

Initially, the database should be developed with a limited number of enterprises from different sectors, then expanded after the collection method and confidentiality safeguards have been tested.

Data collection and publication must, of course, respect commercial confidentiality, enterprise rights, and applicable law.

4-4. Participation in the National Adaptation Plan Process

Iran's NAP readiness programme envisages participation by stakeholders, including the private sector [12].

The Iran Chamber should therefore consider formally expressing its willingness to share enterprise data and experiences, identify proposed projects, and participate in technical consultations through the appropriate official channels.

This participation could help connect national adaptation planning with the practical needs of production and investment.

4-5. Policy and Regulatory Recommendations

4-5-1. Developing Data for Economic Decision-Making

Data on water, climate, floods, subsidence, and dust storms should, wherever possible, be provided in standardised formats that meet economic decision-makers' needs.

Working Group Recommendation: Cooperation between specialist agencies and business associations to develop enterprise-level risk information services.

4-5-2. Screening Climate Risks in Long-Term Investments

Feasibility studies for major, long-lived projects should assess water, heat, flood, subsidence, and coastal risks in a manner appropriate to the project's location and type of activity.

Such screening can complement existing environmental and technical assessments and could initially be introduced through guidance or pilot activities.

4-5-3. Gradually Revising Design Criteria

Design standards for long-lived infrastructure should increasingly account for plausible future conditions relating to temperature, extreme rainfall, drainage, water levels, and material durability.

4-5-4. Facilitating Investment and Technological Cooperation

Existing laws and regulations—including the National Climate Change Management Programme, the Law on Financing Production and Infrastructure, and the Foreign Investment Promotion and Protection Act—provide a basis for examining partnership and investment models [8, 28, 29].

Working Group Recommendation: Identify regulatory and operational barriers to adaptation projects and develop specific proposals to simplify permitted pathways for partnerships, financing, and technology transfer.

None of these legal provisions should be represented as granting automatic or exclusive exemptions or incentives to all adaptation projects.

4-5-5. Developing Insurance and Financial Risk Management Instruments

The development of insurance instruments for climate hazards requires data on hazards, exposed assets, loss histories, and risk management capacity.

Specialist dialogue between the Iran Chamber, insurers, data providers, and business associations should be initiated to examine the feasibility of appropriate insurance products.

4-5-6. Addressing Climate Hazards in HSE

Heat stress and other workplace-related climate hazards should be incorporated into enterprises' occupational health and safety programmes in a way appropriate to their activities [15, 16].

4-5-7. Private-Sector Participation in Operational Programmes

The National Climate Change Management Programme establishes a framework for action by responsible government agencies [8].

Regular consultations with business associations and relevant enterprises should be considered on matters directly affecting production and investment.

4-6. International Requests and Proposals at COP31

4-6-1. Adaptation Finance

Iran's private sector can emphasise the importance of developing countries' access to finance for adaptation. UNEP has also highlighted the global gap between adaptation finance needs and available resources [13].

Effective requests require presenting specific projects supported by a defined problem, technical information, and outcome indicators, rather than broad appeals alone.

4-6-2. Access to Technology

Priority private-sector needs can be articulated in water management and recycling, climate monitoring, impact-based warnings, climate-smart agriculture, infrastructure monitoring, and risk modelling.

For each area, the specific technology need, existing domestic capacity, gap to be addressed, and expected form of cooperation should be identified.

4-6-3. Applied Climate Services

Strengthening cooperation among research institutions, meteorological organisations, and enterprises to translate climate data into economic risk information is a promising area for collaboration.

4-6-4. Specialist Capacity-Building

Training on enterprise climate risk assessment, business continuity management, avoided-loss measurement, and project preparation could be a focus for scientific and technical cooperation.

4-6-5. Insurance and Risk Financing

Cooperation on hazard analysis, insurance-product design, improved loss data, and evaluation of financial partnership models could form part of discussions with specialist organisations.

4-6-6. Direct Cooperation among Enterprises and Institutions

In addition to presenting policy positions, COP31 participation should facilitate specific company-to-company, chamber-to-chamber, university-to-industry, and project-to-capital discussions.

In all cases, the feasibility of cooperation should be assessed in light of applicable laws and operational constraints.

4-7. Proposed Monitoring and Indicator Framework

Not all 59 global Belém Adaptation Indicators are suitable for directly measuring enterprise performance. As global indicators, they require a context-sensitive selection of those relevant to the country and private sector, consistent with their official framework [10, 11].

A two-tier monitoring system is proposed.

Tier One: Selected global adaptation indicators relating to water, agriculture, infrastructure, technology, capacity-building, finance, and adaptation implementation.

Tier Two: Enterprise-level operational and economic indicators, such as the number of companies assessed, the share of water recycled, production downtime, avoided losses, workers covered by heat management programmes, and investment-ready projects.

This framework should distinguish three concepts:

Output: An activity completed or product delivered, such as commissioning a warning system.

Outcome: A change in performance, such as a shorter response time.

Economic impact: An estimable final consequence, such as reduced damage or downtime costs.

4-8. Proposed Iran Chamber Action Plan

4-8-1. Actions before COP31

Given the short time remaining before the Conference, priority should not be given to rushing into large-scale project implementation.

Realistic actions include:

1. Review and approval of the Working Group's report;

2. Selection of three to five priority projects;

3. Preparation of preliminary project concept notes in English;

4. Drafting a private-sector policy position on adaptation;

5. Identification of potential cooperation partners;

6. Preliminary assessment of legal barriers and requirements for each project;

7. Preparation of official key messages for Chamber leadership to use in negotiations and technical meetings.

4-8-2. Six Months after COP31

The Chamber should consider initiating the design of an enterprise risk assessment toolkit, selecting a number of companies and industrial estates for pilot implementation, and launching the first round of data collection on losses and adaptation experiences.

During the same period, it could establish a network of scientific, economic, technical, and legal specialists to support the Working Group and proposed projects.

4-8-3. The First Year

Priorities would include pilot assessments, risk profiles for selected companies, identification of implementable projects, launch of a workplace heat-stress management pilot, and publication of the first progress report.

4-8-4. Two- to Three-Year Horizon

In the medium term, the report proposes expanding the assessment toolkit, extending the database, examining insurance products, developing the investment project pipeline, and publishing periodic reports on private-sector resilience.

The ultimate objective is to move climate adaptation beyond a one-off international conference and integrate it into the Iran Chamber's specialist and economic services.

4-9. Proposed Private-Sector Policy Position in Iran

Iran's private sector considers climate adaptation not a peripheral environmental issue, but part of risk management, capital protection, production continuity, and supply-chain sustainability.

Strengthening resilience requires action in water-resource management, infrastructure, workforce health, supply chains, climate services, insurance, and investment.

Iran's private sector has the capacity to participate in risk assessment, project identification and implementation, technology development, and adaptation planning. It emphasises access to data, technical expertise, capacity-building, finance, and international cooperation that is lawful and practically feasible. In line with its remit and capacities, the Iran Chamber is prepared to facilitate links among enterprises, research institutions, competent government agencies, and potential technology and finance partners.

4-10. Key Messages for the Iran Chamber Delegation at COP31

1. Climate resilience is an economic necessity, not an environmental add-on.

Climate resilience is an economic necessity, not a peripheral environmental issue.

2. Iran faces a combination of climate risks and structural vulnerabilities; adaptation solutions must therefore be tailored to individual regions and sectors.

3. The private sector possesses experience and capacities relevant to adaptation, but more systematic identification, documentation, and evaluation of their effectiveness are needed.

4. To turn climate data into investment decisions, the private sector needs risk assessment tools and applied climate services.

5. International adaptation cooperation should encompass technology, training, engineering services, research, and project preparation as well as finance.

6. The Iran Chamber can serve as a bridge between enterprises' needs and scientific, technological, and financial capabilities.

7. COP31 participation will be more valuable when policy messages are accompanied by specific cooperation proposals and assessable projects.

Conclusions

In Iran, climate change acts upon a background of existing vulnerabilities. Water scarcity, groundwater depletion, subsidence, dust storms, and infrastructure vulnerability have multiple causes, and it would be scientifically incorrect to attribute them entirely to climate change. At the same time, warming and changing climatic conditions can intensify pressures on these systems [20, 21, 22].

From an economic standpoint, this has two fundamental implications.

First, uncertainty about the precise magnitude of future climate change should not justify postponing all adaptation measures. Factories, power plants, ports, railways, and industrial estates are built for long service lives and should be capable of functioning acceptably under a range of plausible future conditions.

Second, much economic vulnerability can be managed. An enterprise may not control temperature or rainfall, but it can improve its water efficiency, alternative supplies, drainage, emergency plans, secondary suppliers, workforce protection, and insurance coverage.

The study finds that, alongside significant climate risks, Iran has scientific, engineering, industrial, and institutional capacities to act. Experience in water management and recycling, resilient agriculture programmes, monitoring and modelling capabilities, and the adopted policy framework provide a potential foundation for a private-sector adaptation programme [8, 12, 17, 30, 31].

Nevertheless, a considerable gap remains between existing capacities and a coherent implementation system. Major gaps identified include the lack of comprehensive data on business measures, losses, and adaptation outcomes; the limited number of projects supported by investment documentation; and the need for more applied climate services.

The report's principal recommendation is that the Iran Chamber develop four complementary capacities:

1. An enterprise climate risk assessment system;

2. A database of losses, operational interruptions, and adaptation experiences;

3. A pipeline of projects that can be developed into investment opportunities;

4. A sustained mechanism for engagement among government, the private sector, research institutions, and technology and finance partners.

With these capacities in place, the Iran Chamber's participation in COP31 could extend beyond the presentation of a research report and help initiate a durable process for reducing economic vulnerability.

The report's final message is that climate adaptation is a framework for better decision-making under uncertainty and for protecting production, employment, and investment.

Final Recommendations of the Climate Adaptation and Resilience Working Group

1. The Iran Chamber should formally recognise climate risk as a component of private-sector economic risk management and business continuity.

2. Development of the Iran Private Sector Climate Risk Assessment Toolkit should begin as the Working Group's flagship project.

3. A pilot climate risk assessment should be conducted in at least one industrial estate.

4. Water management and recycling projects in water-intensive industries should be prioritised for presentation, accompanied by a review of technological requirements and financing models.

5. A workplace heat-stress management pilot should be designed for one or more highly exposed economic activities.

6. A database should be established to record enterprises' losses, operational interruptions, and adaptation measures.

7. A cooperation mechanism should connect the Iran Chamber with specialist agencies, the insurance industry, research centres, and business associations to develop climate services and risk management instruments.

8. The Iran Chamber should examine and pursue formal, structured participation by the private sector in the NAP process.

9. A subset of the global Belém Adaptation Indicators, complemented by enterprise-specific measures, should be developed to monitor private-sector adaptation.

10. Following completion of their technical, economic, legal, and operational documentation, three to five projects should be selected from the proposed portfolio for presentation in COP31 discussions.

11. Priority projects should specify their technology needs, expected forms of international cooperation, permitting status, and potential financing barriers.

12. Adaptation should remain part of the Iran Chamber's work beyond COP31 rather than being confined to preparations for the Conference.

Annex 1 — Proposed Risk and Action Matrix

Risk	Sectors Exposed	Economic Consequence	Proposed Action
Water stress and drought	Agriculture, industry, mining, and energy	Constraints on production and expansion	Water audits, recycling, and alternative supply planning
Extreme heat	Workers, industry, mining, and construction	Lower productivity and higher safety risks	Heat-stress management programme
Land subsidence	Industry, transmission lines, roads, and railways	Asset damage and higher maintenance costs	Subsidence monitoring and investment-site screening
Flooding	Factories, warehouses, transport, and industrial estates	Direct losses and operational interruption	Risk mapping, drainage, and continuity planning
Dust storms	Transport, industry, and agriculture	Operational disruption and equipment wear	Impact-based warnings and maintenance actions
Southern coastal hazards	Ports and coastal industries	Losses and trade disruption	Extreme-water-level assessment and resilience measures
Declining Caspian Sea levels	Ports, fisheries, and tourism	Changes in access and infrastructure performance	Shoreline monitoring and revised design
Agricultural production variability	Food industries and exports	Changes in prices and raw-material supplies	Diversified sourcing, water efficiency, and value-chain management

Annex 2 — Enterprise Climate Risk Assessment Framework

The following steps are proposed for each business site or economic activity:

1. Identify hazards relevant to the location and economic activity;
2. Identify critical assets and activities;
3. Determine the exposure of assets and activities;
4. Assess sensitivity and existing adaptive capacity;
5. Estimate operational and economic consequences;
6. Select risk avoidance, reduction, transfer, or acceptance measures;
7. Define outcome indicators, responsible persons, and monitoring plans;
8. Record findings in a risk file and review them periodically.

The proposed output is an enterprise Climate Risk Register.

Annex 3 — Proposed Adaptation Project Concept Note Template

Project Concept / Project Teaser

Project Title:

English Project Title:

Target Hazard or Vulnerability:

Economic Sector and Geographic Location:

Problem Description and Available Evidence:

Principal Assets and Stakeholders:

Proposed Technical Solution:

Required Technology:

Technology or Implementation Capacity Available Domestically:

Technology and Know-How Gap:

Potential Implementing Entity:

Domestic Partner(s):

Proposed International Partner or Desired Type of Partner:

Project Status: Initial concept / pre-feasibility / feasibility / ready for implementation / under implementation

Estimated Capital Expenditure (CAPEX):

Estimated Operating Expenditure (OPEX):

Business Model and Revenue or Cost-Saving Stream:

Proposed Financing Model:

Permitting Status and Legal Requirements:

Potential Applicability of Foreign Investment or Financing Legislation:

Potential Barriers and Restrictions on Cooperation:

Proposed Implementation Period:

Output Indicator:

Outcome Indicator:

Method for Estimating Avoided Losses:

Project Implementation Risks:

Scalability and Replicability:

Official Contact Details of the Proposing Institution:

Note: The inclusion of estimated information in this concept note does not constitute final technical or financial approval of the project.

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