IRAN ECONOMIC MONITOR

Managing Economic Uncertainties

Spring 2022

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Iran Economic Monitor

Managing Economic Uncertainties

With a Special Focus
Preparing for an Uncertain Water Future

Spring 2022

Middle East and North Africa Region

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ABBREVIATIONS AND ACRONYMS

CAB	Current account balance
CBI	Central Bank of Iran
COVID-19	Corona Virus Disease 2019 (Novel Coronavirus)
CPI	Consumer price inflation
bbl	Barrel of crude oil
GDP	Gross domestic product
ICCIMA	Iran Chamber of Commerce, Industries, Mines & Agriculture
IEM	Iran Economic Monitor
IRICA	Islamic Republic of Iran's Customs Administration
LHS	Left-hand-side
mbpd	Million barrels per day
MENA	Middle East and North Africa
m/m	Month-on-month
mm	Millimeters
NIMA	Unified system of foreign exchange transactions (Persian acronym)
OPEC	Organization of Petroleum Exporting Countries
PBO	Plan and Budget Organization
PMI	Purchasing Managers' Index
pp	Percentage point
RHS	Right-hand-side
q/q	Quarter-on-quarter
SCI	Statistical Centre of Iran
TEDPIX	Tehran Stock Exchange main index
TSE	Tehran Stock Exchange
US(A)	United States of America
US$/USD	United States Dollar
y/y	Year-on-year

PREFACE

The Iran Economic Monitor (IEM) provides an update on key economic developments and policies. It examines these economic developments and policies in a longer-term and global context and assesses their implications for the outlook for the country. The IEM's coverage ranges from the macro-economy to financial markets to indicators of human welfare and development. It is intended for a wide audience, including policy makers, business leaders, financial market participants, and the community of analysts and professionals engaged on Iran.

The Iran Economic Monitor is a product of the World Bank's Global Practice for Macroeconomics, Trade and Investment (MTI) team within the Global Practice Group for Equitable Growth, Finance and Innovation (EFI). The tenth issue of the IEM was prepared by Majid Kazemi (Economist, Task Team Leader, EMNMT) and Razieh Zahedi (Consultant, EMNMT) under the general guidance of Saroj Kumar Jha (Regional Director), Eric Le Borgne (Practice Manager, EMNMT), and Norbert Fiess (Lead economist, EMNDR). The macro chapter benefitted from comments received from Luan Zhao (Senior Economist, EMNMT). The special focus chapter on water and climate was prepared by a water sector team (SMNWA) consisting of Amal Talbi (Lead Water Resource Management Specialist), Anders Jagerskog (Senior Water Resource Management Specialist), Elvira Cusiqoyllor Broeks Motta (Water Sector Specialist), and Luis Gonzaga Alvarez Garcia Moran (Analyst) under the guidance of Michael Haney (Practice Manager, SMNWA). Muna Abed Salim (Senior Program Assistant) print-produced the report.

The findings, interpretations, and conclusions expressed in this Monitor are those of World Bank staff and do not necessarily reflect the views of the Executive Board of the World Bank or the governments they represent.

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EXECUTIVE SUMMARY

Recent Macroeconomic Developments and Outlook

Iran's economy continued its gradual recovery in 2021/22[1] following the rebound in domestic and external demand. Iran's gross domestic product (GDP) grew by 4.7 percent in 2021/22, marking seven consecutive quarters of year on year (y/y) growth. The recovery in global oil demand along with the pick-up in Iran's oil exports drove a strong expansion in oil production of 10.1 percent y/y during this period. Less strict containment measures and an accelerated vaccination rollout led to a 6.5 percent expansion in services—the main driver of non-oil growth (3.9 percent) in 2021/22. However, unprecedented droughts and energy shortages led the labor-intensive agriculture and construction sectors to contract. As such, despite experiencing two years of economic growth, total employment has yet to recover to its pre-pandemic level, especially among women.

Despite a more accommodative fiscal policy in 2021/22, higher oil and tax revenues have improved the fiscal deficit-to-GDP ratio. In 2021/22, the government's general budget resources (expenditures plus acquisition of financial assets) grew by 78 percent within the range of the two scenarios envisioned in the budget. The growth in expenditures was driven by an increase in public sector wages, adjustments to pension payments to compensate for the loss of purchasing power due to inflation, and rising import costs. On the revenue side, planned oil revenues are reported to have been fully realized in 2021/22 due to higher oil prices and oil export volumes in the second half of the year. Despite some challenges, efforts towards domestic revenue mobilization and expanding the tax base helped improve non-oil revenues. Tax revenues met their planned budget target, in part aided by the impact of inflation on the nominal growth of the tax base. As a result, the fiscal deficit is estimated to have moderated to 5.3 percent of GDP in 2021/22 from 6.3 percent of GDP in 2020/21.

Consumer price inflation accelerated due to a combination of supply-push and demand-pull factors, adding to pressures on the welfare of lower-income households. In 2021/22, Iran marked its third consecutive year of annual inflation above 35 percent, driven by a rapid growth in monetary aggregates, inflationary expectations, and rising global commodity prices. Headline and core inflation climbed to 40.2 percent and 36.7 percent in 2021/22, respectively, with headline inflation registering the highest rate in a decade. The surge in food prices following the war in Ukraine added to inflationary pressures and increased the fiscal burden of subsidized food imports. In response to

[1] The Iranian calendar year starts on March 21 of every year and ends on March 20 of the following year.

the growing food import bill, the authorities ended the import subsidies for some essential goods, increased the guaranteed purchase price for domestically produced wheat, and raised the administered price of certain food items to reduce smuggling. To mitigate the impact on consumers, these measures were combined with the introduction of additional cash transfers and announced plans for the deployment of electronic coupons for purchase of essential food items. These measures led to monthly inflation increasing to 12.2 percent in June 2022 month-on-month (m/m)—a record high for monthly inflation. Food prices increased by 25 percent m/m, which was felt most by lower income deciles and in rural areas.

GDP growth is projected to remain modest in the medium term, as the economy remains constrained by both global and domestic growth bottlenecks. Higher inflation is forecast to weigh on consumption and to keep demand sluggish after an initial post-pandemic rebound. Growth projections for Iran in 2022–24 have improved with higher projected oil prices and oil market supply gaps that allow the country to produce more oil and petroleum products to meet export demand. The non-oil sector is also expected to benefit from spillovers from higher oil export proceeds. However, the continuation of sanctions, subdued net capital formation particularly in the oil sector, energy shortages, global inflation, and the scarring effects of the pandemic on the labor market limit growth prospects.

A more favorable global oil market outlook is projected to improve Iran's fiscal and external balances. Higher projected oil prices in the outlook period and growth in oil export volumes considering the tighter global oil market are forecast to improve oil revenues. However, high growth in expenditures due to a growing wage bill and pension spending as well as higher food import costs and additional cash transfers are projected to keep the fiscal balance in a deficit of 4.4 percent of GDP per year in 2022–24. Iran's current account balance is also forecast to remain in surplus over the medium term due to improved oil market conditions.

Iran's economic outlook is subject to significant risks. On the upside, further increases as well as sustained high oil prices can result in higher oil export revenues. If oil markets seek all available supply to ease price pressures, stronger demand could also lead to higher oil export volumes, thereby further improving fiscal and external balances. If economic sanctions are significantly eased or removed following a breakthrough in nuclear negotiations, this could further improve Iran's economic prospects and curb inflationary expectations. Downside risks relate to the impact of surging global food prices, the resurgence of new COVID-19 variants, and a worsening of the climate change impact. Soaring global food prices due to the war in Ukraine, if prolonged, could heavily impact crop and fertilizer supplies and raise food security risks. Further price increases would add to Iran's import bill and put more pressure on the government and its limited accessible foreign exchange reserves. Persistent high inflation, if unmitigated, would increase pressures on lower-income deciles and adds to existing social grievances.

Addressing long-term development challenges, including impending climate change shocks, requires a comprehensive package of economic reforms complemented by adequate social protection measures. Economic policies could be better geared towards creating much-needed jobs. This could be achieved through investment in infrastructure, especially in under-developed regions, stimulating private sector activity via an improved business environment and reducing distortive pricing interventions. Decarbonizing infrastructure, transition towards sustainable sources of energy and accelerated adoption of climate-smart water and agriculture interventions will also be key in managing climate change risks. Rightsizing current expenditures, including reforming domestic energy prices, and increasing tax revenues through the removal of exemptions, addressing tax evasion, and improving value-added tax collection can create much needed fiscal space. Relatively low public debt allows the government to finance its deficit by issuing government bonds within a well-defined medium-term fiscal framework; this reduces reliance on banks' resources or the central bank's balance sheet. To address the potential income and distributional impact of reforms, the most vulnerable households need to be protected by well-targeted social safety transfers.

Preparing for an Uncertain Water Future

Iran is a water-stressed country where consumption outstrips natural regeneration. Climate change will widen the water supply and demand gap, worsening water challenges for Iran and its neighbors. Irrigated agriculture consumes the greatest share of water (92 percent), but that water is not used well in Iran: agricultural water productivity is one of the lowest in the region. Climate change will negatively affect the gross domestic product (GDP), demand for labor, and food prices. According to the World Bank Water in the Balance report, in a scenario where water availability reduces by 20 percent and where higher temperatures negatively impact crop yields, GDP would decrease by 7 percent relative to the baseline (real GDP in 2016) or by about US$30 billion. Demand for labor would fall by up to 4.8 percent and 10 percent relative to the 2016 baseline for agricultural and non-agricultural activities, respectively. Consumer food prices would increase by up to 8.2 percent. This analysis relies on short to medium time likely changes in crop yields and water availability prior to 2050. Since reduced water availability is one of the biggest economic impacts of climate change, Iran can benefit from lessons from countries that have coped with this issue. These pathways include (i) effective water resources management, (ii) improved water use efficiency with water demand management policies, (iii) adept institutions and tailored policies, and (iv) collaboration with riparian countries.

چکیده مدیریتی

تحولات اخیر و و چشم‌انداز اقتصاد ایران

پس از رونق تقاضای داخلی و خارجی، اقتصاد ایران به روند بهبود تدریجی خود در سال 1400 ادامه داد. تولید ناخالص داخلی ایران در سال 1400 با رشد 4.7 درصد، هفتمین فصل متوالی رشد سالانه را ثبت کرد. بهبود تقاضای جهانی نفت به همراه افزایش صادرات نفت ایران باعث افزایش شدید تولید نفت به میزان 10.1 درصد شد. اقدامات سخت‌گیرانه محدودتر و واکسیناسیون گسترده، منجر به رونق قابل‌توجه بخش خدمات به میزان 6.5 درصد شد که محرک اصلی رشد بخش غیرنفتی (3.9 درصد) در سال 1400 بود. با این حال، خشکسالی بی‌سابقه و کمبود انرژی، منجر به رکود بخش‌های کاربر چون بخش کشاورزی و ساختمان شد. با این وجود، علیرغم دو سال رشد اقتصادی، اشتغال کل، مخصوصاً اشتغال زنان، هنوز به سطح قبل از پاندمی کرونا نرسیده است.

علی‌رغم سیاست مالی سازگارتر در سال 1400، افزایش درآمدهای نفتی و مالیاتی نسبت کسری بودجه به تولید ناخالص داخلی را بهبود بخشید. در سال 1400، منابع بودجه عمومی دولت (هزینه‌ها به علاوه تملک دارایی‌های مالی) ، در محدوده دو سقف قانون بودجه 1400، 78 درصد رشد کرد. رشد مخارج عمدتاً ناشی از افزایش دستمزدهای بخش دولتی، تعدیل مستمری بازنشستگان برای جبران کاهش قدرت خرید ناشی از تورم، و افزایش هزینه‌های واردات بود. به دلیل افزایش قیمت نفت و افزایش حجم صادرات نفت در نیمه دوم سال،گزارش شده‌است که درآمدهای نفتی برنامه‌ریزی شده به طور کامل در سال 1400 محقق شده‌اند. علی‌رغم برخی چالش‌ها، تلاش برای تجمیع درآمدهای داخلی و گسترش پایه مالیاتی به بهبود درآمدهای غیرنفتی کمک کرد. درآمدهای مالیاتی به طور کامل محقق شد، که تا حدی به دلیل تأثیر تورم در رشد اسمی پایه مالیاتی بود. در نتیجه، برآورد می‌شود که کسری بودجه از 6.3 درصد تولید ناخالص داخلی در سال 1399 به 5.3 درصد تولید ناخالص داخلی در سال 1400 تعدیل شده‌باشد.

تورم قیمت مصرف کننده به دلیل ترکیبی از عوامل فشار عرضه و کشش تقاضا شتاب گرفت و منجر به فشار مضاعف بر رفاه خانوارهای کم‌درآمد گردید. ایران در سال 1400، برای سومین سال متوالی، تورم سالانه بیش از 35 درصد را ثبت کرد که ناشی از رشد سریع کل‌های پولی، انتظارات تورمی و افزایش قیمت‌های جهانی کالاها بود. تورم کل و تورم هسته به ترتیب به 40.2 درصد و 36.7 درصد در سال 1400 رسیدند که بالاترین نرخ تورم در یک دهه اخیر بود. افزایش قیمت مواد غذایی پس از جنگ در اوکراین، بر این فشارهای تورمی افزوده و بار بودجه‌ای واردات یارانه‌ای مواد غذایی را افزایش داده است. در واکنش به افزایش هزینه واردات مواد غذایی، مسئولین کشور، پرداخت یارانه به واردات برخی محصولات اساسی را قطع کردند، قیمت خرید تضمینی گندم تولید داخل را افزایش دادند و به منظور کاهش قاچاق کالاها، قیمت مصوب برخی از اقلام غذایی را افزایش دادند. در عوض به منظور کاهش تأثیر بر مصرف‌کنندگان، این اقدامات همراه با پرداخت‌های نقدی جدید و ارائه برنامه‌هایی برای توسعه کوپن الکترونیکی برای خرید برخی مواد غذایی اساسی شد. این اقدامات منجر به افزایش تورم ماهانه در خرداد 1401، به 12.2 درصد (در مقایسه با ماه قبل) شد، که بالاترین رکورد برای تورم ماهانه را ثبت کرد. قیمت مواد غذایی 25 درصد (نسبت به ماه قبل) افزایش یافت که در دهک‌های درآمدی پایین و در مناطق روستایی، بیشتر احساس شد.

پیش‌بینی می‌شود که رشد تولید ناخالص داخلی در میان‌مدت در حد متوسط باقی بماند، زیرا اقتصاد هم‌چنان متأثر از محدودیت‌های ناشی از تنگناهای رشد جهانی و داخلی است. پس از بهبود اولیه بعد از پاندمی، انتظار می‌رود که تورم بالاتر، مصرف را کاهش داده و منجر به کاهش تقاضا شود. پیش‌بینی‌های رشد در سال‌های 03-1401 برای ایران به دلیل قیمت‌های انتظاری بالاتر نفت و شکاف عرضه در بازار نفت که به کشور اجازه تولید بیشتر نفت و فرآورده‌های نفتی برای پاسخگویی به تقاضای صادراتی می‌دهد، بهبود یافته است. هم‌چنین انتظار می‌رود

بخش غیرنفتی از سرریزهای حاصل از درآمدهای بالاتر صادرات نفت بهره مند شود. با این حال، تداوم تحریم‌ها، کاهش تشکیل سرمایه خالص به‌ویژه در بخش نفت، کمبود انرژی، تورم جهانی و اثرات مخرب و ماندگار پاندمی کرونا بر بازار کار، چشم‌انداز رشد را محدود می‌کند.

پیش‌بینی می‌شود که چشم‌انداز مطلوب‌تر بازار جهانی نفت، هم‌چنین باعث بهبود ترازهای بودجه‌ای و خارجی ایران شود. پیش‌بینی افزایش قیمت نفت در دوره چشم انداز و انتظار رشد حجم صادرات نفت با توجه به تنگناهای بازار جهانی نفت باعث بهبود درآمدهای نفتی شود. با این حال، انتظار می‌رود که رشد بالای مخارج دولت به دلیل افزایش دستمزدها و هزینه‌های بازنشستگی، کسری بودجه را در حد 4.4 درصد تولید ناخالص داخلی در سال‌های 03-1401 حفظ کند. هم‌چنین پیش‌بینی می‌شود که حساب جاری ایران در میان مدت به دلیل بهبود شرایط بازار نفت، در تراز مازاد باقی بماند.

چشم انداز اقتصادی ایران در معرض ریسک‌های قابل توجهی است. از یک سو، افزایش بیشتر و تداوم قیمت‌های بالای نفت می‌تواند منجر به درآمدهای صادراتی نفت بیشتر شود. اگر بازارهای نفت به دنبال تمام عرضه موجود برای کاهش فشار قیمت باشند، تقاضای قوی‌تر می‌تواند منجر به افزایش حجم صادرات نفت کشور شود و در نتیجه منجر به بهبود بیشتر تراز بودجه و تراز خارجی شود. اگر تحریم‌های اقتصادی به طور قابل توجهی کاهش یابند یا برداشته شوند، این می‌تواند منجر به بهبود بیشتر چشم انداز اقتصادی ایران و مهار انتظارات تورمی شود. از سوی دیگر، ریسک منفی شامل اثرات افزایش قیمت‌های جهانی مواد غذایی، شیوع مجدد سویه‌های جدید کووید 19، و بدترشدن تاثیر تغییرات اقلیمی است. افزایش شدید قیمت جهانی مواد غذایی به دلیل جنگ در اوکراین، اگر تداوم یابد، می‌تواند به شدت بر عرضه محصولات کشاورزی و کود شیمیایی تأثیر بگذارد و خطرات امنیت غذایی را افزایش دهد. افزایش قیمت‌ها منجر به افزایش بیشتر هزینه‌های واردات می‌شود و فشار بر دولت و ذخایر ارزی محدود کشور افزایش می‌یابد. تداوم فشارهای تورمی، در صورت عدم جبران، فشار بر دهک‌های درآمدی پایین را افزایش می‌دهد و بر نارضایتی‌های اجتماعی می‌افزاید.

پرداختن به چالش‌های توسعه بلندمدت، از جمله تکانه‌های قریب‌الوقوع تغییرات اقلیمی، نیازمند بسته‌ای جامع از اصلاحات اقتصادی است که با حمایت‌های اجتماعی کافی تکمیل می‌شود. سیاست‌های اقتصادی را می‌توان در جهت ایجاد مشاغل که شدیداً مورد نیاز است هدایت کرد. این امر می‌تواند از طریق سرمایه‌گذاری در زیرساخت‌ها به‌ویژه در مناطق کم‌تر توسعه یافته، تحریک فعالیت بخش خصوصی از طریق بهبود محیط کسب وکار، و کاهش مداخلات قیمت‌گذاری حاصل شود. همچنین، کربن‌زدایی زیرساخت‌ها، گذار به منابع پایدار انرژی و تسریع در به‌کارگیری راهکارهای اقلیم‌محور در بخش آب و کشاورزی، در مدیریت ریسک‌های اقلیمی مهم خواهند بود. اصلاح هزینه‌های جاری، از جمله اصلاح قیمت‌های داخلی انرژی، و افزایش درآمدهای مالیاتی از طریق حذف معافیت‌ها، رسیدگی به فرار مالیاتی و بهبود مالیات بر ارزش افزوده، می‌تواند فضای بودجه‌ای مورد نیاز را ایجاد کند. بدهی عمومی نسبتاً پایین به دولت این امکان را می‌دهد که کسری بودجه خود را با انتشار اوراق بدهی دولتی در یک چارچوب مالی میان‌مدت مشخص تأمین کند، که این امر اتکا به منابع بانک‌ها یا ترازنامه بانک مرکزی را کاهش می‌دهد. برای حفظ درآمدها و تأثیر توزیعی بالقوه این اصلاحات، نیاز است که آسیب پذیرترین خانوارها با پرداخت‌های حمایتی هدفمند محافظت شوند.

آماده شدن برای آینده آبی نامطمئن

ایران کشوری با تنش آبی است که مصرف منابع آب آن از بازآفرینی طبیعی آن پیشی گرفته است. بیشترین سهم مصرف آب در کشور متعلق به کشاورزی است (92 درصد)، اما این آب به خوبی استفاده نمی‌شود زیرا بهره‌وری آب کشاورزی یکی از پایین‌ترین‌ها در منطقه است. تغییرات اقلیمی بر تولید ناخالص داخلی، تقاضای نیروی کار، و قیمت مواد غذایی تأثیر منفی خواهد گذاشت. بر اساس گزارش «آب در تراز» بانک جهانی در سناریویی که دسترسی به آب تا 20 درصد کاهش یافته و دماهای بالاتر بر عملکرد محصول تأثیر منفی می‌گذارد، تولید ناخالص داخلی 7 درصد نسبت به تولید ناخالص داخلی واقعی سال پایه 1395 یا حدود 30 میلیارد دلار کاهش می‌یابد. تقاضا برای نیروی کار در فعالیت‌های کشاورزی و غیرکشاورزی به ترتیب تا 4.8 درصد و 10 درصد نسبت به سال پایه 1395 کاهش می‌یابد. قیمت مواد غذایی مصرفی تا 8.2 درصد افزایش می‌یابد. این محاسبات بر افق‌های زمانی کوتاه تا میان‌مدت تغییرات در بازدهی محصول و در دسترس بودن آب متکی است و بر تغییراتی تمرکز می‌کند که به احتمال زیاد قبل از سال 1429 اتفاق می‌افتد. از آنجایی که کاهش دسترسی به آب یکی از بزرگترین تأثیرات اقتصادی تغییرات اقلیمی است، ایران می‌تواند از درس‌هایی از کشورهایی که با این مسئله کنار آمده‌اند، بهره‌مند شود. این مسیرهای گزار شامل است از (1) مدیریت مؤثر منابع آب، (2) بهبود کارایی مصرف آب با سیاست‌های مدیریت تقاضای آب، (3) مؤسسات تخصصی و سیاست‌های متناسب، و (4) همکاری با کشورهای همجوار.

1

RECENT ECONOMIC AND POLICY DEVELOPMENTS

Output and Demand

Iran's economy grew for the second consecutive year in 2021/22,[2] **after a two-year recession.** Real gross domestic product (GDP) grew by 4.7 percent in 2021/22. Growth was largely driven by oil sector activity which grew by 10.1 percent, following stronger global oil demand and a pick-up in Iran's oil exports (Figure 1). Non-oil GDP also grew by 3.9 percent following the easing of pandemic-related mobility restrictions and a gradual rebound in economic activity as services expanded by 6.5 percent in the same period (Figure 2). The modest growth in manufacturing activity (3.3 percent)[3] was partly offset by the decline in construction (6.9 percent), resulting in industry sector activity to marginally grow by 1.1 percent in 2021/22. Severe droughts and water management challenges hindered agriculture production, which contracted by 2.6 percent.

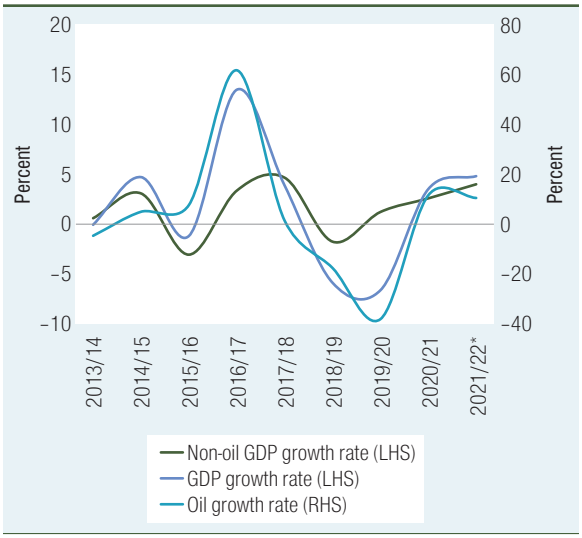
The recovery in global oil demand along with a pick-up in Iran's oil exports drove a strong expansion in oil production. According to OPEC's secondary sources,[4] Iran's oil production grew by 22.8 percent in 2021/22, and the price of Iran's crude surged by more than 82.5 percent (Figure 3). Oil production volume in April 2022 reached a three-year high of 2.56 million barrels per day (mbpd) but remained 1.3 mbpd below its pre-sanctions level in 2018/19. Despite the increase in oil production and exemption from recent OPEC production quotas, Iran's share in OPEC production declined from 9.7 percent in April to about 8.9 percent between November 2021 and May 2022 as OPEC+ production cuts started to be tapered. The oil and gas sector suffers from years of under-investment largely related to ongoing US sanctions. Over the last decade, investments were even below depreciation costs. The growth rate of net capital stock in the oil and gas sector was negative for

[2] The Iranian calendar year starts on March 21 of every year and ends on March 20 of the following year.

[3] Manufacturing growth in 2021/22 was about 40 percent of the last year due to large electricity shortages in summer 2021.

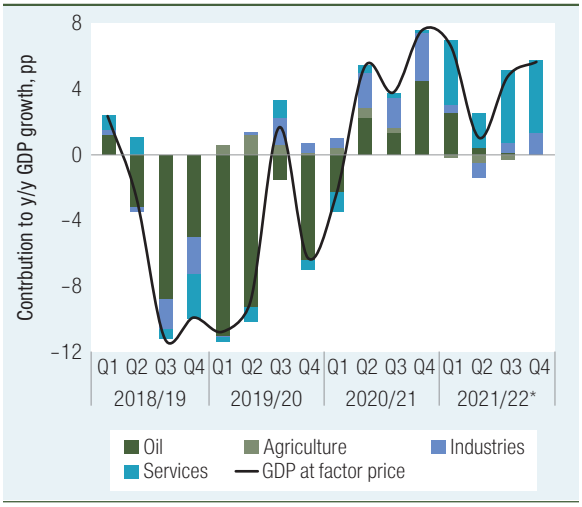
[4] Iran has stopped publishing crude oil production and export volumes data since the reimposition of US sanctions in 2018

FIGURE 1 • GDP rebounded in 2021/22…



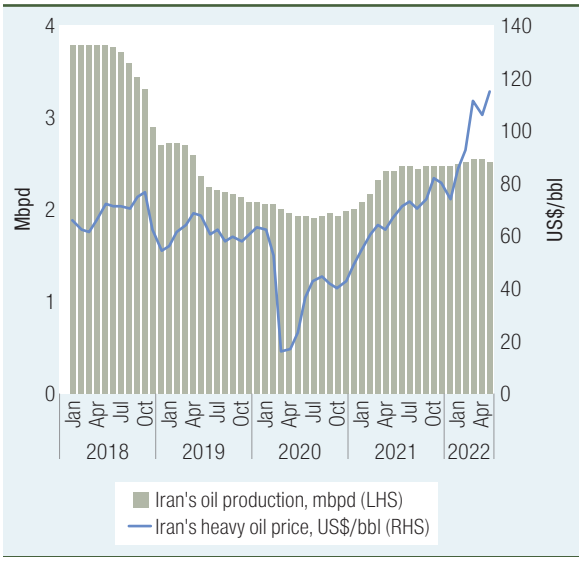
Source: Central Bank of Iran (CBI) and World Bank staff calculations.
Note: * Based on the 2016/17 base year series.

FIGURE 2 • …Driven by a Rebound in Oil and Services Sectors



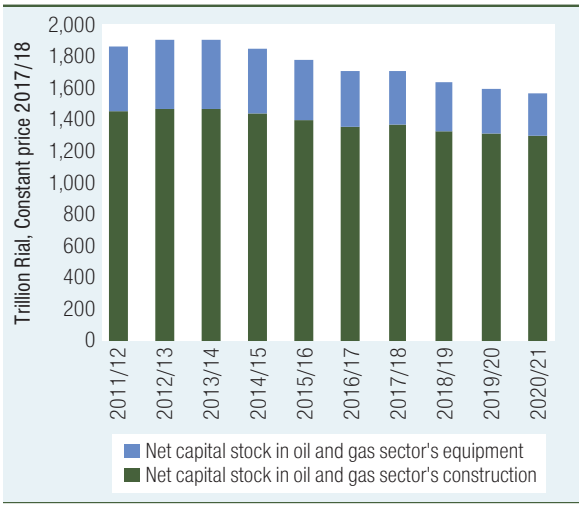
Source: CBI and World Bank staff calculations.
Note: * Based on the 2016/17 base year series.

FIGURE 3 • Global Oil Demand Recovery Drove Oil Production and Export Price…



Source: OPEC Monthly Oil Market Report.

FIGURE 4 • …but Oil Production Capacity Remained Constrained by Declining Capital Stock

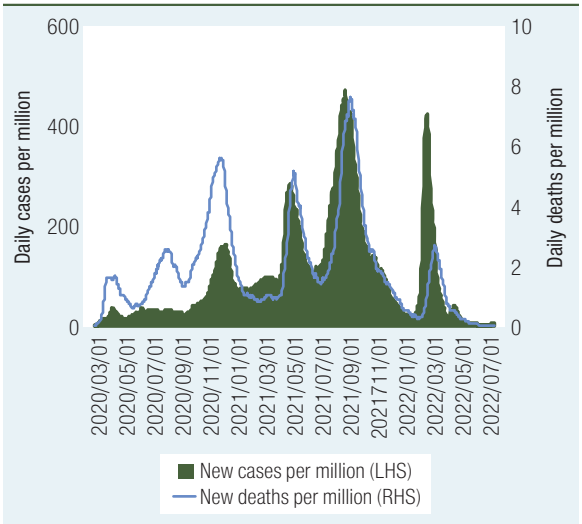


Source: CBI and World Bank staff calculations.
Note: Data based on the 2016/17 base year series.

most of the last decade, and the total net capital stock of the oil and gas sector in 2020/21 was 16 percent below the level a decade earlier (Figure 4). While authorities have announced a series of new investments, the underinvestment in the previous years could pose as a bottleneck for ramping up oil production in the future should export conditions improve further.

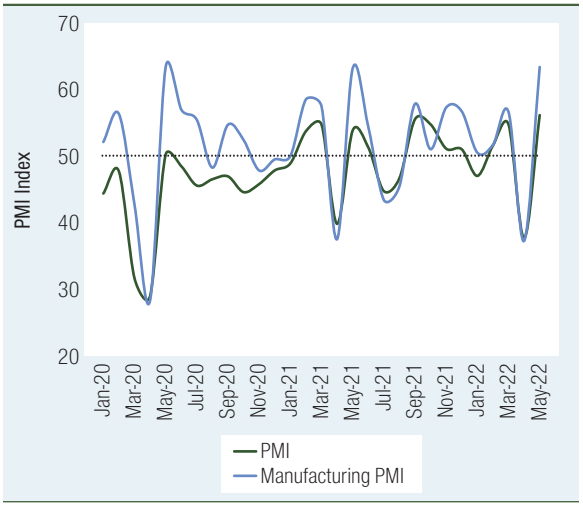
Less strict containment measures and a rapid vaccination rollout in 2021/22 led to a strong expansion in services—the main driver of non-oil growth. After more than two years of the COVID-19 pandemic, the situation is returning to normal. Iran was one of the first countries with large outbreaks and was severely affected by six waves of infections, registering over 7.24 million confirmed cases and about 141K

FIGURE 5 • Iran Underwent Six Waves of COVID-19 Infections…



Source: Our world in data.

FIGURE 6 • …and the End of Last Wave Improved Market Sentiments



Source: Iran Chamber of Commerce, Industries, Mines & Agriculture (ICCIMA).
Note: A PMI index above 50 shows producers/managers having a positive outlook.

deaths (Figure 5).[5] The acceleration in vaccination rollout during Q4-2021[6] resulted in a substantial decline in the ratio of daily deaths to new cases and helped confront the spread of the less virulent Omicron variant. Better preparedness led to further easing of containment measures, supporting the expansion in the service sector and in private consumption.

The non-oil industry sector grew moderately, limited by energy shortages and an uncertain investment environment. Energy shortages weighed on manufacturing growth, which together with a sharp decline in construction hampered the growth of the industry sector in 2021/22. After contracting in summer 2021, the purchasing managers' index (PMI) and the manufacturing PMI recovered to positive territory in the second half of 2021/22 (Figure 6). However, this trend was marked by some volatility, reflecting shortages of natural gas and economic uncertainties associated with ongoing nuclear negotiations. In May 2022, the PMI and manufacturing PMI registered their highest levels, one month after recording their lowest levels in the past two years. The recent spike in the PMI reflects the rush to purchase goods ahead of expected higher inflation in the coming months as well as the normalization of business activities after the new-year holidays in April 2022. Construction sector activity has also declined due to the soaring prices for construction materials (over 180 percent during the last two years) and land (over 100 percent in 2019/20-2020/21). Demand for housing has also been impacted by increasing housing prices (more than 300 percent in 2018/19-2020/21), which has made house ownership unaffordable for many Iranians.

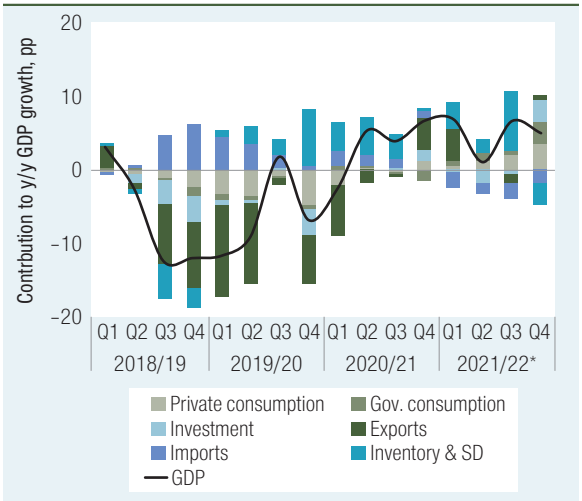
Similar to other countries in the region, Iran faces significant water shortages which threaten the agriculture sector and elevate food security risks. Following the driest year in half-a-century (September 2020-August 2021), rainfall between September 2021 and June 2022 increased by 26 percent y/y.[7] Despite this improvement, rainfall was 22 percent below the long-term average. Recent rainfall was not evenly distributed throughout the country (from 59.8 mm in Yazd to 867 mm in Gilan) and about half of the provinces still faced less precipitation

[5] Accounting for over 29 percent of cases and 44 percent of deaths in the MENA region, ranking 17th and 11th globally in the number of confirmed cases and deaths as of July 5, 2022, respectively (https://www.worldometers.info/coronavirus).

[6] As of July 5, 2022, 68.3 percent of the 85-million population are fully vaccinated and about 32.7 percent received their boosters.

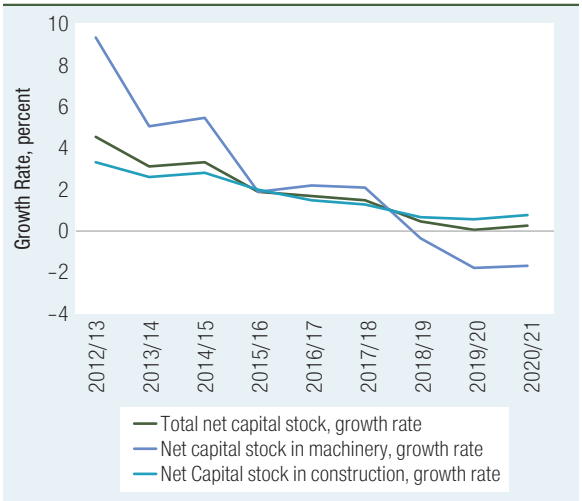
[7] http://www.ion.ir/news/778613.

FIGURE 7 • Consumption Was the Main Driver of GDP Growth on the Demand Side



Source: Central Bank of Iran (CBI) and World Bank staff calculations.
Note: * Based on the 2016/17 base year series.

FIGURE 8 • The Capital Stock Has Declined Over the Last Decade



Source: CBI and World Bank staff calculations.
Note: * Based on the 2016/17 base year series.

compared to last year.[8] According to the Ministry of Energy, water storage behind dams declined by 5 percent y/y in September 2021 to June 2022 and as of July 2022, water reservoirs in dams are below half capacity.[9] Overextraction from finite groundwater resources in recent years has brought these resources to low critical levels.[10] Water-related aspects of climate change have significant implications for future growth, food security, and jobs in Iran (see the special focus chapter on water).

On the expenditure side, growth in 2021/22 was largely driven by consumption. Private and government consumption grew by 3.9 percent and 8.3 percent in 2021/22, respectively, after contracting by over 10 percent during the previous three years due to high inflation and the pandemic. Higher oil revenues prompted the government to increase consumption under the second-tier, higher budget envelope (see the public sector finance section on 2021/22 budget provision). Private consumption was supported by the easing of pandemic-related restrictions as well as supplementary increases to pensions payment and wages. Consumption growth reflects the expansion in services, which accounts for a significant share in consumption. Higher consumption was partly met through higher imports, which rose by 24.1 percent in 2021/22 in real terms, outpacing exports growth of 5.2 percent. Meanwhile, a sharp decline in construction investment (7.1 percent) caused overall investments to stagnate in 2021/22.

The sharp decline in gross capital formation, which has weakened Iran's potential GDP growth, has been a legacy of the previous years' sanctions and decline in oil revenue. In the three years following the re-imposition of US sanctions in 2018, real public investment contracted by an annualized rate of 20 percent. During this period, the growth rate of net capital investment was less than one percent, and new investments barely compensated for the depreciation cost of the capital stock (Figure 8). The growth rate of net

8 Iran is among the world's semi-arid and arid countries and average rainfall is about 250 mm which is about one third of the global average and two-third of it vanishes because of evaporation. Furthermore, about 20 percent of areas across Iran are highly prone to flooding. In 2021/22, large floods hit Iran's southern provinces (Fars, Kerman, Hormozgan, Sistan and Baluchestan, and Khuzestan) which have struggled with the worsening water crisis in recent years.

9 During the same period, the decline in dams' water storage in the province of Tehran was 18 percent (y/y), leaving water levels at only 34 percent of their full storage capacity; while the decline in dams in Hamedan and Sistan was more than 50 percent (y/y) and their water levels are less than 20 percent (Ministry of Energy).

10 For further information see Noori et al. (2021) and Ashraf et al. (2021).

capital stock had been worsening since 2014/15. This downward trend in capital accumulation was even stronger for investment in machinery and equipment, which, since 2018/19, consistently contracted due to the impact of sanctions on Iran's trade and foreign exchange reserves. The lower accumulation of capital stock affects productive capacity and prospects of future growth.

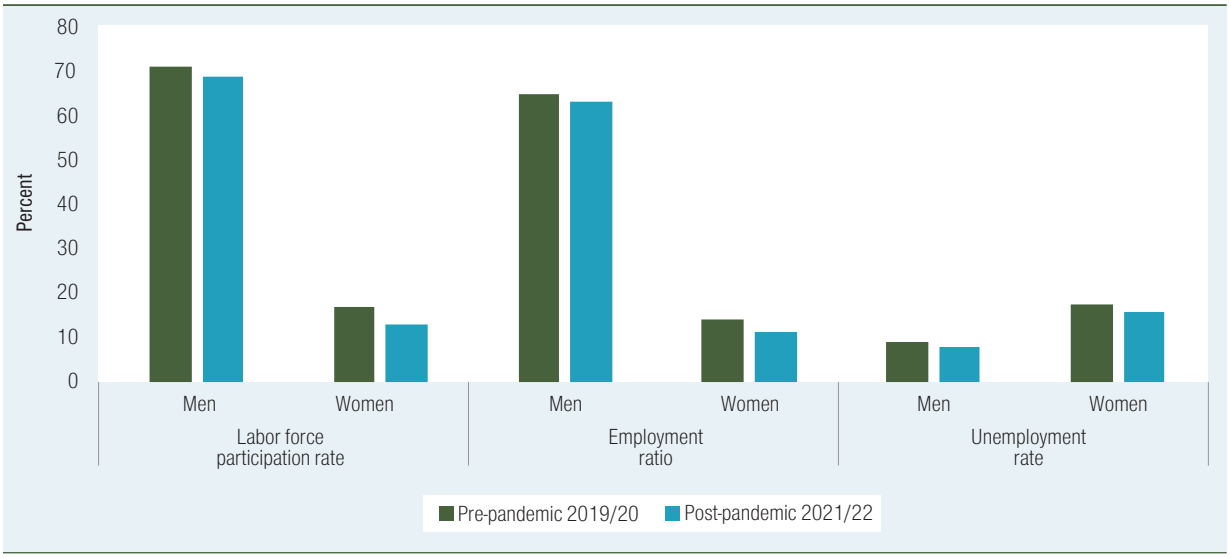
Labor Market and Jobs

The recovery in the labor market has lagged the rebound in GDP. While GDP expanded by 3.4 percent in 2020/21 and 4.7 percent in 2021/22, employment in 2021/22 remained at 3.4 percent (0.83 million jobs) below its pre-crisis level in 2019/20.[11] This outcome was in part due the fact that the less-labor intensive oil sector drove the recovery in GDP. The agriculture sector contraction added to job creation challenges. Since the start of the pandemic, the working-age population increased by 1.4 million while the active population declined by 1.3 million (with 78 percent being female). This brought the labor force participation rate to 40.9 percent in 2021/22, down by 3.2 pp compared to 2019/20. The decline in the active population was partly due to a lack of job opportunities in the agriculture sector, reflected in a stronger decline in the labor force participation rate in rural areas (4.1 pp decline from 47.3 percent in 2019/20). As such, the recent low unemployment rate of 9.2 percent in 2021/22 masks important labor market challenges. Underemployment also remained high at 10.2 percent in 2021/22, which also highlights the lack of adequate jobs for those employed.

Female employment remained significantly below the pre-pandemic level, maintaining previous gender disparities in Iran's labor market. Employment for males in 2021/22 recovered to level of 2019/20 due to greater job creation in the male-dominated industrial sector (about half a million jobs). Over the same period, female employment was 18 percent lower due to the disproportionate effect of the pandemic on women including working mothers who took on the majority of family caregiving responsibility during school and childcare closures. This led the employment to the working-age population ratio for females to decline by more than 2.9 pp to 11.1 percent compared to 2019/20. Female labor force participation also declined to 13.3 percent in 2021/22, from 17 percent in 2019/20 before the pandemic started. This trend added to pre-existing gender disparities in labor market outcomes. While the female education level in Iran is

[11] Only one-third of the 1.4 million jobs lost during the pandemic (Q3-19/20 to Q3-21/22) were recovered.

FIGURE 9 • The Pandemic Deteriorated Gender Disparities in Iran's Labor Market



Source: SCI and World Bank staff calculations.

comparable to OECD countries (both with 51 percent of tertiary education), the female labor force participation rate remains one of the lowest in the world. Even women who participate in the labor force face an unemployment rate that is on average 1.5–2 times higher than that for men. Women were disproportionally affected by the pandemic due to childcare responsibilities and a higher female concentration in pandemic-affected sectors, such as services and the informal sector (see Box 1).

Iran's labor market indicators show significant regional disparities, highlighting the different impact of the pandemic across the country. The employment ratio, the ratio of employed population to working age population, declined during the pandemic by about 2.2 pp and 75 percent of provinces experienced a decline in their employment ratio. Provinces with a larger share of employment in the informal sector and in the agriculture sector experienced worse outcomes during the pandemic. In 2021/22, Zanjan and Yazd had the highest employment to working-age population ratio (around 42 percent) and the lowest belonged to Ilam, Sistan, and Kohgiloyeh (around 31 percent). The labor force participation rate also varied significantly between provinces in 2021/22, the highest rate was in Yazd at 47.8 percent, and the lowest in Ilam, Sistan, and Kohgiloyeh at around 34 percent. The unemployment rate ranged from 6.5 percent (Zanjan and North Khorasan) to 15.8 percent (Hormozgan) (Figure 10). The differences in labor market outcomes across Iran's provinces reflect differences in annual government budget allocations, differences in previous development plans' objectives for regional concentration of industries, varying levels of infrastructure, as well as different geographical characteristics, including proximity to a border.[12]

Public Sector Finance[13]

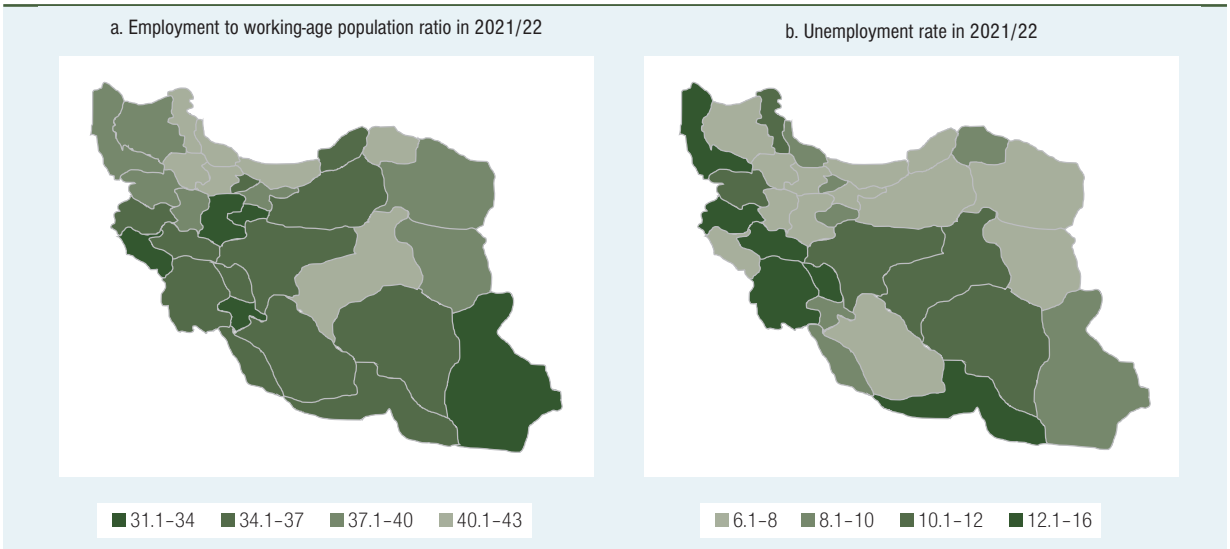
Fiscal policy in 2021/22 was more accommodative, aided by improved oil income revenues that were used to counter the impact of high inflation. General budget resources (expenditures plus acquisition of financial assets) grew by 78 percent in nominal terms,[14] keeping within the two scenario targets outlined

[12] Yazd, Semnan, Tehran, Isfahan, and Markazi are among the provinces with the highest development indices, and Sistan, Kohkiloyeh, Kurdistan, Hormozgan, and Ilam have the lowest development indices (Etaat and Shojaenasab, 2014).

[13] Since the re-imposition of US sanctions in 2018, Iran no longer publishes fiscal data on a regular basis. Data used in this section are based on those quoted by officials in the media.

[14] All growth rates of fiscal data variables are reported in nominal terms. Growth rates below the inflation rate show a decline in real-terms.

FIGURE 10 • Significant Regional Disparities Exist in Iran's Labor Market



Source: SCI and World Bank staff calculations.

BOX 1 INFORMAL EMPLOYMENT IN IRAN

According to estimates by the Statistical Center of Iran (SCI),[a] informal employment accounts for about 60 percent of total employment in Iran. This rate of informality is comparable with the world average (ILO 2018),[b] but some nuances exist. About one-third of informal employees in Iran work for the formal sector and just over 2 percent work in households (Table B1.1). The share of informal employment is slightly higher for women (63 percent) than men (58 percent), while the world average of informal employment is higher among men (63 percent) compared to women (58.1 percent). Only in low and lower-middle-income countries, women are more exposed to the informal economy. In Iran, over 75 percent of those working in rural areas make their living in the informal economy while half of the urban employment is informal. Informal employment in rural areas in the world is twice as high in urban areas due to the high share of the agriculture sector as the main source of informal employment (ILO 2018).

The level of informal employment varies across the different sectors of the economy and based on the level of education. Similar to other countries, the agriculture sector accounts for the highest level of informal employment in Iran (78 percent) but it is lower than the world average (93 percent). Informal employment in Iran accounts for two-thirds of employment in the industry sector and half of the employment in the service sector. Globally about 57.2 percent of industry workers and 47.2 percent of service workers are informal. In addition, the level of education of individuals is highly correlated with informality. According to international data, people with university degrees are less likely to be informally employed. In Iran, the share of informal employment among people with no eduction is 84.2 percent, for primary education 76.3, for secondary education 70.1 percent, and for territory education 32.7 percent. The global average for these numbers are 93.8 percent, 84.6 percent, 51.7 percent, and 23.8 respectively (ILO, 2018). This indicates the level of informality in Iranian educated people above their international counterparts while informal employment of people with no education is below the global average.

The level of informality also varies substantially throughout Iran. The range of the ratio of formal employment varies from 38 percent (Semnan) to above 70 percent (Kohkiloyeh, Ardebil, and Hamedan). The ratio of formal employment is higher among the provinces close to the border, and provinces with a higher poverty rate have a higher share of informal employment (e.g., Sistan and Baluchistan, and Kohkiloyeh).

In line with the global trend, informal employment was disproportionally affected by the pandemic. According to ILO (2022), based on a sample of 10 countries, job losses among informal employment were about two to three times larger than that of formal employees and

TABLE B1.1 • Informal Employment Varies Significantly among Different Sectors

	2019/20	2020/21	The world average in 2016
Formal sector	31.6	31.6	11.0
Informal sector	64.1	66.0	84.9
Household	4.3	2.4	4.1
Men	58.3	57.8	63.0
Women	63.4	59.0	58.1
Urban area	53.3	51.8	43.7
Rural area	75.7	75.8	80.0
Public sector	10.5	8.4	NA
Private sector	67.9	66.7	NA
No education	84.2	84.2	93.8
Primary education	76.3	75.1	84.6
Secondary education	70.1	69.7	51.7
University education	32.7	30.1	23.8
Agriculture	78.1	77.1	93.6
Industry	66.3	65.7	57.2
Services	48.1	46.1	47.2

Source: ILO (2018), SCI, and World Bank staff calculations.

(continued on next page)

BOX 1 INFORMAL EMPLOYMENT IN IRAN *(continued)*

while formal employment almost recovered in mid-2021, this was not the case for informal employment. In Iran, the job losses in the informal sector in 2020/21 was over 6 percent compared to only 1.2 percent in the formal sector. In 2020/21, male job losses in the formal and informal sectors were 0.4 and 2.6 percent, respectively; those of females were 5 percent and 21.2 percent, respectively.

Drivers of informality

Informality is driven by regulatory inefficiencies, low institutional capacity, and weak macroeconomic conditions. The restrictiveness of economic regulations in the formal sector such as restrictive and overlapping laws, regulatory and administrative complexity, and strict labor protection laws limits firms' ability to adjust to shocks and as a result contributes to higher informality. Corruption, weakness of the rule of law or weak enforcement evading or contravening regulations, and low quality of government institutions also promote informality. Weak macroeconomic outcomes (lack of economic growth, high inflation, and high level of uncertainty and volatility) together with other constraints such as demographic pressures or urban migration also contribute to the growth of the informal economy (Freije 2001, Alizadeh and Ghafari 2013). These conditions are often amplified by inadequate macroeconomic policy. Inefficient fiscal policy including those related to tax policy and government interventions such as price control policies and trade restrictions (exchange rate controls, import licenses, or high custom duties), impose additional costs on economic activities, making formal economic activities too expensive, especially for small businesses. In Iran, high inflation, negative real interest rates, and domestic currency overvaluation have also led to the development of capital-intensive industries, which meant that the country could not utilize its full potential workforce (Asadzadeh et al. 2019, Nili and Maleki 2006).

Addressing informality

Tackling informality relies on a comprehensive socio-economic series of measures that are implemented in a balanced and gradual fashion. Key policies to this end include labor market legislation reform complemented by social protection programs, increasing labor market flexibility (that allows for the adjustment of both real wages and employment as a response to macroeconomic shocks), reducing red tape, and promoting pro-growth macroeconomic policies. Training opportunities for informal workers improve their productivity and increase their reservation wage, making them less vulnerable, especially with the growing role of the digital economy. Reducing informality in Iran can help address other goals including reducing poverty and inequality, domestic revenue mobilization, and reducing budgetary pressures from social insurance and pension transfers.

[a] Based on the informality report published by SCI in 2021/22.
[b] The informal employment accounts for about 68 percent in Asia and the Pacific and Arab states, but it is about 25 percent in Europe and Central Asia.

in the budget.[15] The growth in expenditures was, in part, helped by a reported improvement in realization of oil and tax revenues (see below) which helped moderate the growing fiscal deficits of recent years (Figure 12).

In line with higher oil prices and oil export volumes, oil revenues grew rapidly in 2021/22, albeit from a low base. According to the authorities, oil revenues grew by over 400 percent y/y in the first nine months of 2021/22 (9M-21/22) (April to November 2021), though from a low base.[16] While oil export volumes are estimated to have been below the budget's second, more ambitious target in 2021/22,[17] a surge in oil prices (83 percent) drove a surge in oil revenues. In 2022/23 and since the start of the war in Ukraine and subsequent sanctions on Russia, oil prices rose to over US$100/bbl during March and May 2022, but Iran's oil export volumes are also estimated to have declined.[18]

Efforts toward domestic revenue mobilization and expanding the tax base helped improve

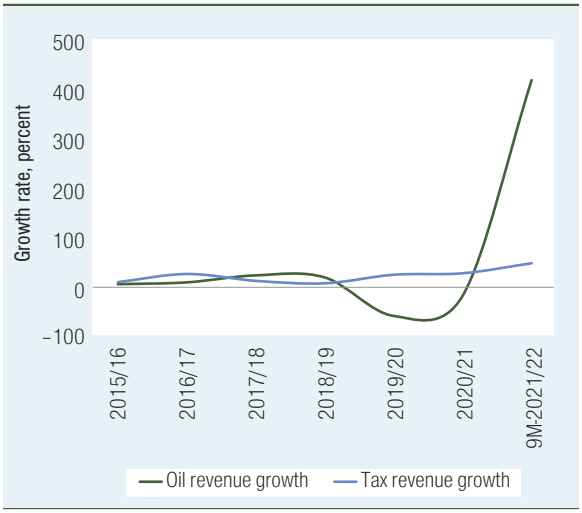
[15] The 2021/22 budget law envisaged a 58 percent expansion compared to the previous year's budget. However, the budget could be expanded by 124 percent if revenues meet their target in the first six months (April-September 2021).

[16] Government oil revenues fell from 6 percent of GDP in 2017/18 to 1.1 percent of GDP in 2020/21 as a result of re-imposed sanctions.

[17] Although official oil export data are not published, estimates of oil exports from remote sensing and tanker tracking sources put the number at below the budget's second target of 2.3 mbpd for 2021/22.

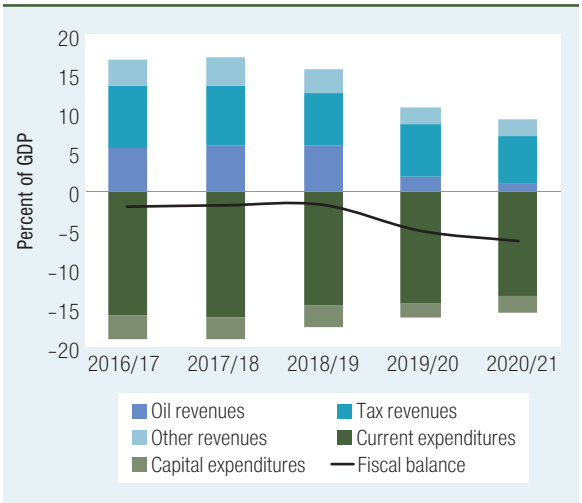
[18] According to Reuters, Iran's oil exports to China was between 0.7 to 0.9 mbpd in March 2022, but they sharply declined to 0.2 to 0.25 mbpd in April (Reuters). This reported decline in Iran's exports is partly related to the heavily discounted price of Russian oil, in response to which Iran also started offering discounts on its crude exports (Bloomberg).

FIGURE 11 • Tax and Oil Revenues Improved in 2021/22…



Source: CBI, Plan and Budget Organization (PBO), media, and World Bank staff calculations.

FIGURE 12 • …which Helped Moderate the Previous Year's Growing Fiscal Deficit



Source: CBI, PBO and World Bank staff calculations.

non-oil revenues. In 11M-21/22 (April 2021 to February 2022), tax revenues met 94 percent of the budget target, in part aided by the inflation effect on the nominal growth of the tax base. While corporate and income tax revenues met their budget targets, only 36 percent of planned wealth tax revenues were collected in the same period. The latter low rate partly reflects the downturn in the stock market as well as challenges in the implementation of taxes on vacant houses and luxury automobiles. The realization of indirect taxes in 11M-21/22 was about 80 percent due to the weaker performance of import taxes (40 percent realization).

To control fiscal pressures, the approved 2022/23 budget is less expansionary compared to the previous year. Based on the 2022/23 Budget Law, total expenditures are to expand by 15 percent, with a higher rate for capital expenditures while revenues are envisioned to grow by 43 percent aided by higher oil and tax revenues (Table 2). The budget forecasts oil revenues to grow by 31 percent, based on oil export volume of 1.4 mbpd and an oil price assumption of US$70/bbl.[19] The government also plans to increase tax revenues by about 60 percent.[20]

Faced with a growing subsidy bill and soaring price of food imports, the government started phasing out exchange rate subsidies with transfers. An important provision in the 2022/23 budget was the approval of a clause that provided the government the discretion to replace the subsidized exchange rate[21] with transfers to lower income deciles. In May 2022, the government announced policies to use the provision to end the exchange rate subsidies for imports of major food staples and replace them with a combination of direct transfers and electronic coupons. These measures also aim to manage domestic consumption and curb the smuggling of subsidized food to neighboring countries (see Box 2 on food security for more details).

[19] This year's budget puts the government share of oil revenues at 40 percent with the remainder going to the sovereign wealth fund (SWF), National Oil Company, and underdeveloped regions. In recent years, the fiscal rule was partially waived to reallocate part of SWF transfers to the budget to cover revenue shortfalls.

[20] Corporation tax will increase by 126 percent, while wealth tax revenues are to decline by 20 percent. Import tax revenues are set to increase by 40 percent as the government intends to replace the subsidized exchange rate with the higher NIMA exchange rate as a basis for import tax calculation.

[21] In 2021/22, the government allocated US$ 12.5 billion to imports of essential food items at the subsidized exchange rate.

TABLE 1 • The 2022/23 Budget Law is Less Accommodative

	2021/22 (IRR billion)	2022/23 (IRR billion)	2022/23 (US$ billion)[a]	Growth (%)
Total revenues	**8,504,460**	**12,173,419**	**52.9**	**43.1**
Current revenues	**4,548,990**	**6,977,103**	**30.3**	**53.4**
Tax revenues	3,298,390	5,324,498	23.1	61.4
Direct taxes	1,490,451	2,476,481	10.8	66.2
Indirect taxes	1,807,939	2,848,017	12.4	57.5
Other revenues	1,250,600	1,652,606	7.2	32.1
Disposal of non-financial assets	**3,955,470**	**5,196,315**	**22.6**	**31.4**
Total expenditures	**10,951,809**	**12,591,254**	**54.7**	**15.0**
Current expenditures	9,189,164	9,990,086	43.4	8.7
Capital expenditures	1,762,646	2,601,167	11.3	47.6
Operational balance	–4,640,174	–3,012,983	–13.1	–35.1
Budget balance	**–2,447,350**	**–417,835**	**–1.8**	**–82.9**
Disposal of financial assets	**4,274,480**	**1,767,900**	**7.7**	**–58.6**
Acquisition of financial assets	**1,827,400**	**1,350,065**	**5.9**	**–26.1**
Net disposal of financial assets	**2,447,080**	**417,835**	**1.8**	**–82.9**
Government general resources	**12,779,209**	**13,941,319**	**54.7**	**9.1**

Source: PBO and World Bank staff calculations.
[a] Converted using the implicit exchange rate of IRR230,000 /USD.

BOX 2 FOOD SECURITY IN IRAN

Iran has long pursued food security and food self-sufficiency[a] in various national and subnational development plans. To bolster agriculture production and to secure affordable consumption, Iran has implemented a combination of policies including tariffs, import subsidies, crop purchase price guarantees, food price subsidies, and significant subsidies on agricultural inputs such as fertilizers, water, and energy (Michel 2019). Although these policies have helped improve food production, it has not been enough to provide food for the growing population and the country has depended on food imports. Moreover, the resulting price distortions have led to wasteful consumption and inefficient resource allocation,[b] leaving a large fiscal burden (the food subsidy bill is estimated as high as 5 percent of GDP in 2020/21). In addition, these policies have also endangered the country's environmental resources and took a toll on land and water resources, leading to urban migration, social grievances, and under-development (Michel 2019). Recent droughts and climate change challenges along with economic sanctions have further aggravated these challenges.

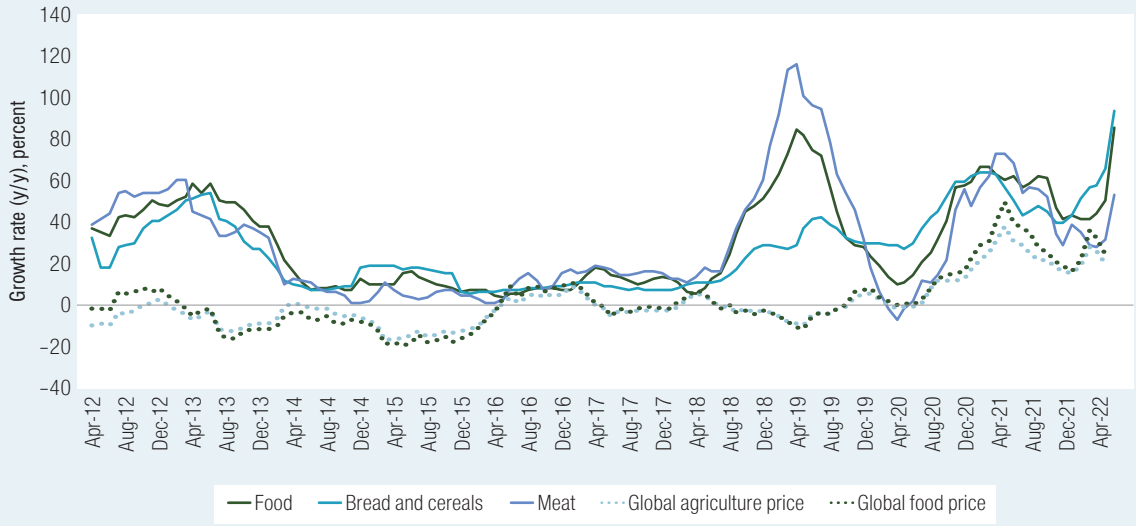
Meeting the country's food demand has become a growing challenge due to rising global commodity prices and limited fiscal space following the pandemic and sanctions. In 2020, food and cereal imports accounted for 37.5 and 12.5 percent of Iran's total imports, respectively. The recent dry weather and drought in Iran have resulted in a substantial reduction in wheat production (about 30 percent), resulting in higher import dependency. This has led to wheat imports surging by more than 200 percent in 2021/22.[c] This trend continued in 2022/23, and in April 2022, the volume of Iran's wheat imports increased by 120 percent y/y. Iran is expected to import 25 million tons of grains in 2022/23, about 28 percent of which will be wheat imports. At the same time, the recent surge in grain prices following the war in Ukraine increased fiscal and external financing pressures. In 2021/22, the government spent US$12.5 billion on imports of essential food items at a subsidized exchange rate which stood at only 15 percent of the parallel market rate.[d] Despite this subsidized exchange rate, food price inflation has been high (over 400 percent Jan 2018-May 2022) and a major driver of overall inflation with a negative impact on vulnerable people who have been disproportionately impacted by successive years of high inflation.

In 2022, the authorities took measures to control the rising food import bill and introduced additional cash transfers to mitigate the impact on households. In May 2022, the government stopped subsidizing imports of certain essential foods and increased the administered

(continued on next page)

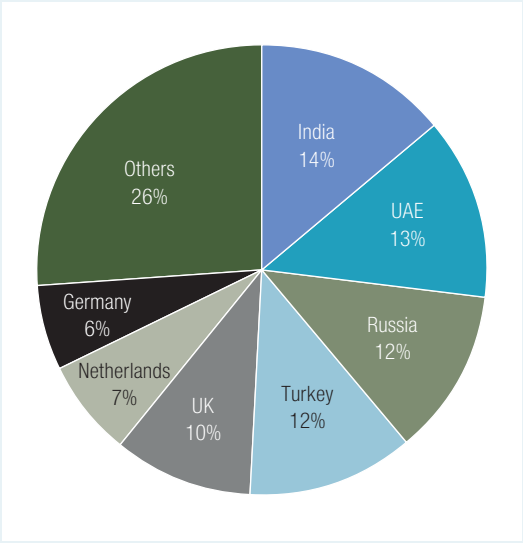
BOX 2 FOOD SECURITY IN IRAN *(continued)*

FIGURE B2.1 • Food Price Inflation Has Been High and More Recently Was Driven by Global Inflation



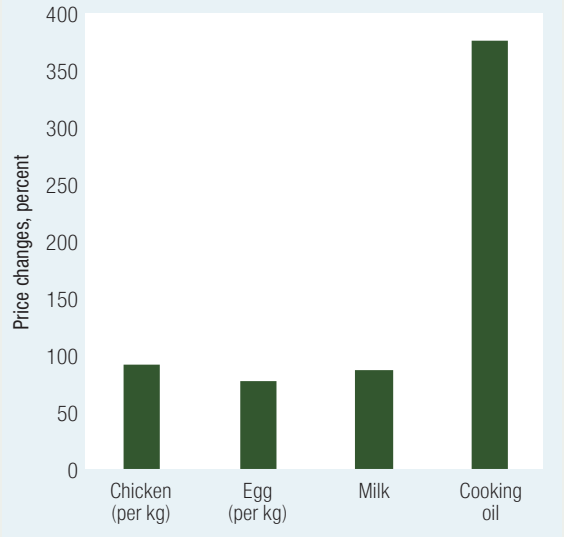
Source: SCI, World Bank Commodity Prices, and World Bank staff calculations.
Note: World Bank commodity price indices for low and middle-income countries (2010=100).

FIGURE B2.2 • Share of Top Partners in Iran's Cereal Imports in 2020



Source: Trade Map Statistics.

FIGURE B2.3 • The Administered Price of Some Essential Goods Increased Sharply in May 2022 (m/m)



Source: Media and World Bank staff calculations.

price of chicken, eggs, diary, and cooking oil (Figure B2.3). The authorities also raised the guaranteed purchase price of wheat (it almost doubled) to incentivize domestic production and to curb smuggling due to a rising gap in food prices with neighboring countries. A two-month direct cash transfer of US$12–14 per individual per month (inclusive of existing cash transfers) was also provided to over 23 million heads of households (the first 9 income deciles).[e] These measures were part of the 2022/23 budget plan to phase out the subsidized exchange rate.[f] The removal of the subsidy on flour for industrial users resulted in a surge in flour-based food prices (including for pasta,

(continued on next page)

BOX 2 FOOD SECURITY IN IRAN

confectionery items, and unsubsidized types of bread such as baguettes) by over 300 percent. Traditional flatbreads (accounting for 70–80 percent of wheat consumption) were temporarily exempt from price increases, until the government can introduce electronic coupons for rations at subsidized prices.

Price reform measures and transfers could help address some of the impending food security challenges, but they also add to inflationary pressures. Cash and non-cash transfers are an important tool in mitigating the impact of rising prices in the short term. The cash transfer program introduced in 2010[g] and the recently launched national welfare database offer the government unique tools to target vulnerable consumers efficiently and accurately. If these tools are fully utilized, the policy can help manage food security challenges and reduce both fiscal and external account pressures. In the medium-term, the recent measure would also need to be followed with a plan for a gradual phase-out of administered pricing and automatic adjustments to social assistance to protect their real value of these transfers for the most vulnerable. These measures led to a surge in monthly inflation to a record high of 12.2 percent in June 2022 (m/m) as food prices shot up by 25 percent m/m. Inflation was even higher for the lowest income decile (19.5 percent) and those living in rural areas (15.8 percent).

[a] Food security focuses on the equitable and stable availability of food to people regardless of the origin of food production (Azadi et al. 2022). Factors that lead to food insecurity include inadequate food availability, inappropriate use of food or food distribution, disproportional global food distribution, natural disasters, political tensions, low purchasing power and poverty (Akbari et al. 2022).
[b] Agriculture accounts for over 90 percent of water withdrawal while the world average is about 70 percent. In addition, while the country faces unprecedented water shortages, the country exports water-intensive products.
[c] In 2021/22, Iran's main partners in wheat imports include Russia (30 percent), Iraq (15.6 percent), UAE (14 percent), UK (8.6 percent), and the Netherlands (7.5 percent).
[d] In 2018/19, the subsidized exchange rate was initially introduced as a unified exchange rate used for all transactions for a few months and US$31 billion of imports, or 51 percent of goods imports for the year were made at this rate. The subsidized imports were then slashed to US$14 billion in 2019/20 with the accelerated import compression drive. Allocated funds for subsidized imports grew by 40 percent in 2021/22 to US$15.1 billion (accounting for 24 percent of all imports).
[e] Based on the new cash transfer plan, each individual from the bottom three deciles will receive IRR 4 million/per month, and each individual from the next five deciles (decile 4–9), will receive IRR 3 million per month for two months. After that, they will receive digital coupons for essential goods.
[f] According to the authorities, the replacement of exchange rate subsidies with direct consumer subsidies would avoid previous misallocation of exchange rate subsidies and smuggling of cheaper food products to other countries. For example, the flour price differential with neighboring countries had been 10-15 times that of the subsidized domestic prices.
[g] Iran's most notable experience in implementing large-scale price reforms was the ambitious 2010 price subsidy reform. The reforms attempted to replace direct price subsidies with universal cash transfers to households. The 2010 price reform had good preparations but lacked key elements in implementation including having an automatic price adjustment mechanism and a lack of targeted or time bound cash transfers which left a large burden on the budget (see IMF report for more details).

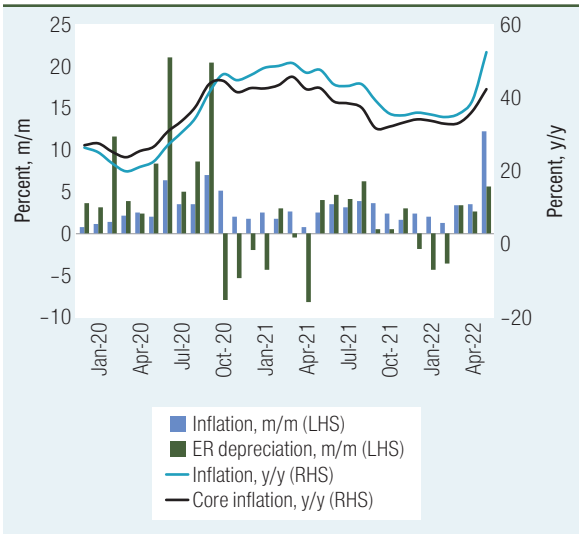
Monetary Policy and Prices

Consumer price inflation (CPI) accelerated due to a combination of supply-push and demand-pull factors. In 2021/22, CPI marked its third consecutive year of inflation of over 35 percent, driven by a rapid growth in monetary aggregates, inflationary expectations, and rising global commodity prices (Figure 13). Headline and core inflation rose to 40.2 percent and 36.7 percent in 2021/22, respectively, with the former registering the highest annual rate in a decade. Food prices and rental costs were the main contributors to high inflation (Figure 14), especially adding pressure to the livelihoods of lower-income households as these items constitute a large share of their consumption basket. In H2-21/22 (Oct 2021–Mar 2022), the appreciation of the rial and lower inflationary expectations due to progress in nuclear talks led to a deceleration in inflation. However, monthly inflation in June 2022 reached a record high (12 percent, m/m) due to the phasing out of the main essential goods' import subsidies and the global surge in commodity prices following the war in Ukraine (see Box 2).

The stop and go in nuclear negotiations drove fluctuations in the foreign exchange market and inflationary expectations. Progress in nuclear talks led the rial to appreciate by 7 percent in Jan-Mar 2022, and the gap between the parallel market and Central Bank's auction exchange rate (NIMA rate) narrowed, indicating subdued inflationary expectations (Figure 15). However, between April to June 2022, the pause in nuclear negotiation led to a drop rial to depreciate by about 12 percent. The depreciation in the rial against the dollar and the increase in global prices led to a rapid growth of import prices (Figure 16).

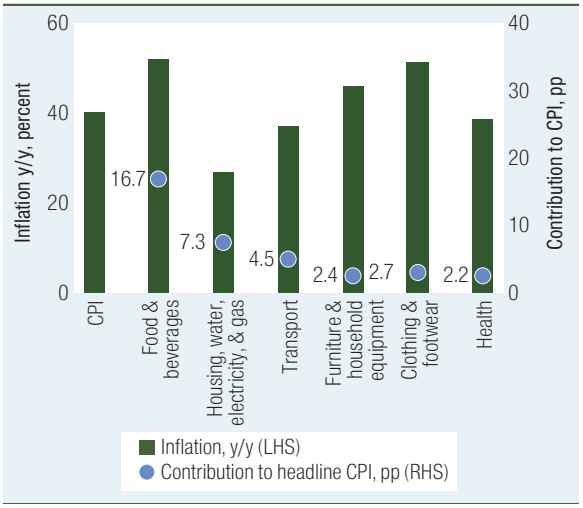
Monetary aggregates expanded at the same pace as in the previous year, keeping inflationary

FIGURE 13 • Inflation Rose Further in 2021/22…



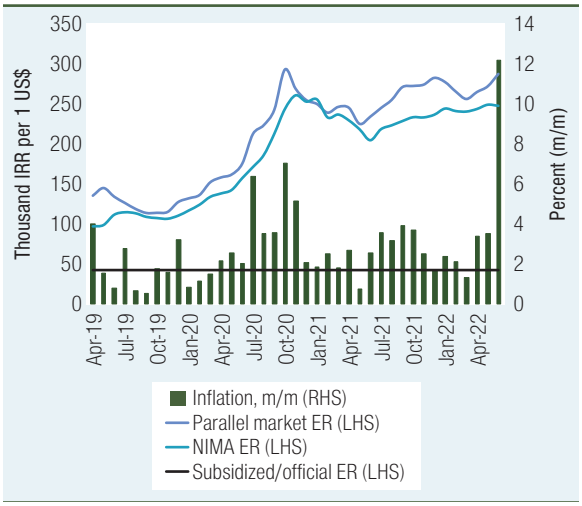
Source: SCI, CBI, and World Bank staff calculations.

FIGURE 14 • …Driven by Higher Food Prices and Rental Costs



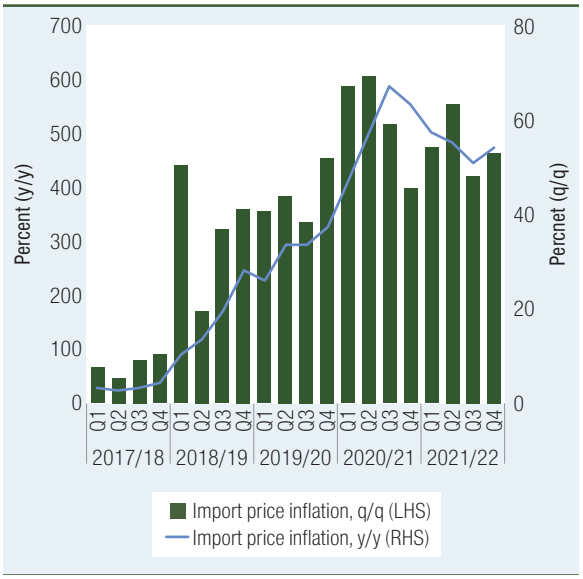
Source: SCI and World Bank staff calculations.

FIGURE 15 • Economic Uncertainties Drove Fluctuations in Rial's Value against the Dollar



Source: SCI and World Bank staff calculations
Note: NIMA, the Persian acronym for "integrated system of foreign exchange transactions", is a foreign exchange auction system administered by the CBI for facilitating foreign currency exchange between exporters and importers.

FIGURE 16 • Currency Depreciation and Global Inflation Drove Up the Price of Imports

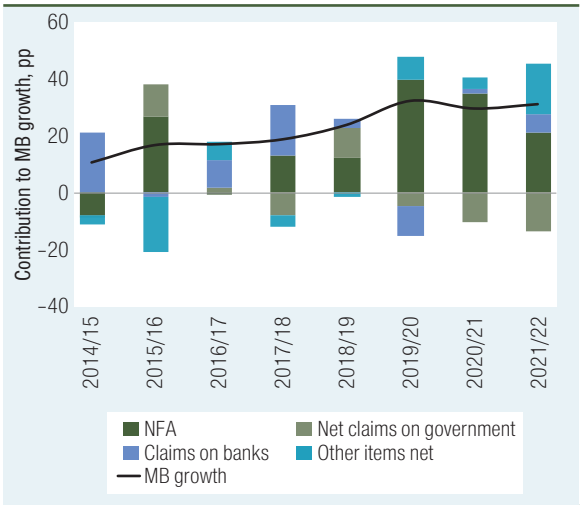


Source: SCI and World Bank staff calculations.

pressures high. In 2021/22, aggregate money (M2) and the monetary base (MB) grew by 39 percent and 31.6 percent, respectively. This expansion was comparable to last year and remained again above long-term average (1974/75-2020/21) of 27 percent and 24.6 percent, respectively. The main drivers in MB growth in 2021/22 were increases in net foreign assets, a re-evaluation of foreign assets and an increase in central bank claims on banks (Figure 17). The Central Bank's claims on banks grew due to a 45.4 percent expansion in banks claims on public organizations in 2021/22 as well as a 56.3 percent growth in banks credit to the private sector during the same period, following a 95 percent increase in 2020/21 (Figure 18).

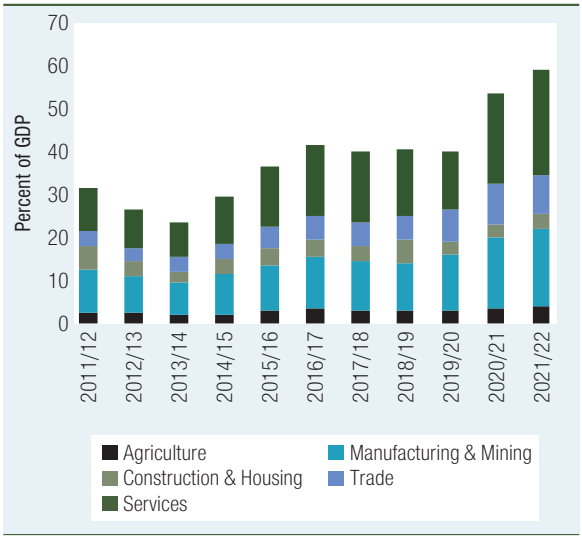
The stock market was less volatile in 2021/22 than the previous year. The unprece-

FIGURE 17 • MB Growth Was Led by Foreign Asset Revaluation, NFA, and CBI Claims on Banks



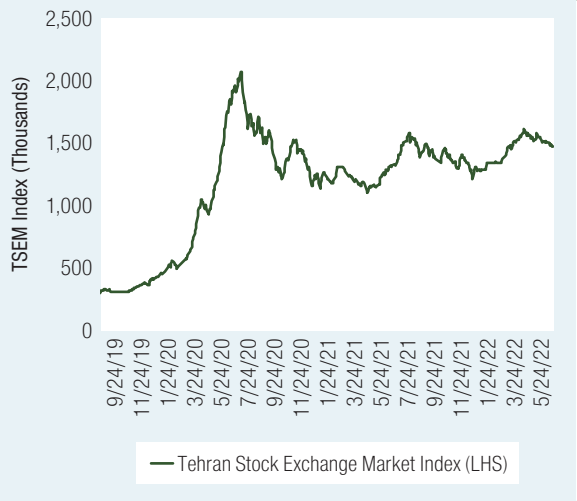
Source: CBI and World Bank staff calculations.

FIGURE 18 • Banking Sector Credit as a Share of GDP Grew Further in 2021/22



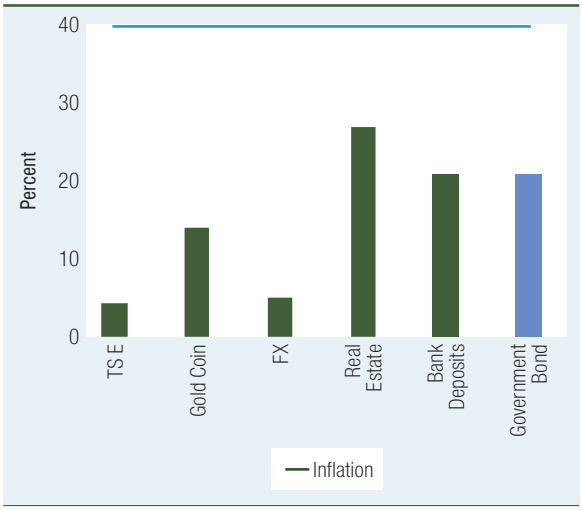
Source: CBI and World Bank staff calculations.

FIGURE 19 • After Experiencing Some Volatility, the Stock Market Edged Up



Source: Tehran Stock Exchange (TSE) and World Bank staff calculations.

FIGURE 20 • The Real Return of All Assets Was Negative in 2021/22



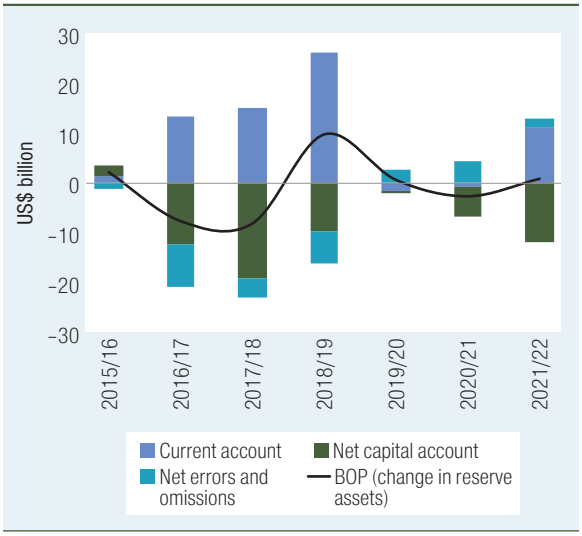
Source: CBI, SCI, and World Bank staff calculations.

dented bull market in mid-2020/21 (over 300 percent growth) was followed by a 40 percent contraction in the main index by March 2021 (Figure 19). The government subsequently implemented various policies including the "3+7 capital market package"[22] to boost the market, albeit with limited success. The downward trend continued during the first half of 2021/22 (H1-21/22) (April to June 2021) and led to an exodus of small investor capital from the market. In 2021/22, the stock market edged up by only 4 percent, the lowest return among all assets (Figure 20).[23] Between April to June 2022, the stock market gained about 10 percent as higher global energy prices made the largest listed industries including petrochemical companies more profitable due to the subsidized domestic electricity prices.

[22] See Iran Economic Monitor Spring 2021.

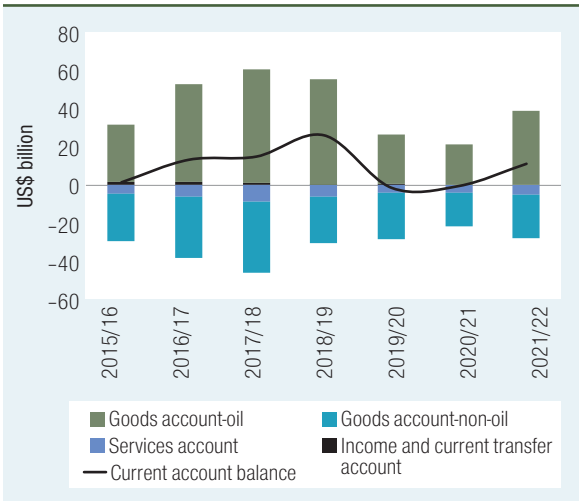
[23] In 2020/21, the stock market yielded a 150 percent average nominal return, the highest return among all assets.

FIGURE 21 • The Capital Account Registered a Deficit in 2021/22



Source: CBI and World Bank staff calculations.

FIGURE 22 • ...while the CAB Registered Surplus Due to Increasing Oil Exports Proceed



Source: CBI and World Bank staff calculations.

External Sector

The rebound in global demand following the pandemic helped push Iran's current account back to surplus, which partly offset the capital account deficit. The strong growth in exports in 2021/22 (59.2 percent, y/y) outweighed the growth in imports (36.5 percent), leading the current account balance to return to surplus (US$11.2 billion) after two consecutive years of deficit in 2019/20 and 2020/21 (Figure 21). The current account surplus partly compensated for the net capital account deficit (US$ 10.1 billion) and international reserves slightly improved by US$0.9 billion. The capital account balance experienced six consecutive years of deficits, partly reflecting a significant amount of capital flight due to economic uncertainty.[24] Although tighter capital controls over the last two years moderated the capital account deficit in 2019/20 and 2020/21, the temporary appreciation of the currency in H1-21/22 provided an opportunity for those seeking to transfer funds abroad, leading to higher capital outflows.

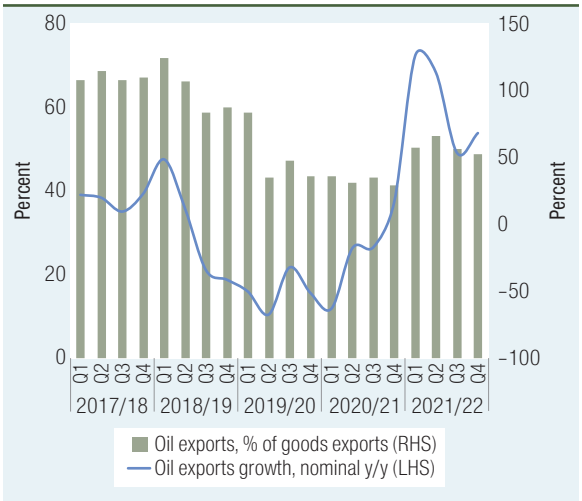
While trade in goods surpassed its pre-pandemic level, services trade has yet to fully recover. The current account in 2021/22 improved significantly compared to its pre-pandemic level in 2019/20, partly due to increasing oil export revenues which benefited both from higher oil prices and oil export volumes but remained below its pre-sanction level (Figure 22). Trade in goods fully recovered from the pandemic. Despite the strong expansion in service exports and imports in 2021/22 (55 percent and 45 percent, respectively), they remained below their pre-pandemic levels by 43 percent and 26 percent, respectively.

Stronger global demand and higher international prices drove a strong expansion in non-oil trade in 2021/22. Following a strong contraction at the onset of the pandemic in early 2020/21, non-oil exports and imports continued their upward trend, surpassing pre-pandemic levels by 16 percent and 19 percent, respectively (Figure 24). With over half of non-oil exports in petroleum products, rising commodity prices also drove up non-oil exports by 37 percent in nominal terms to a new record of US$48 billion in 2021/22. Non-oil imports grew by 34 percent to US$52 billion in 2021/22, outperforming the pre-pandemic level in 2019/20, but they remained 4.5 percent below the pre-sanctions level in 2017/18.

The main driver of non-oil exports was an expansion in exports of petrochemical and

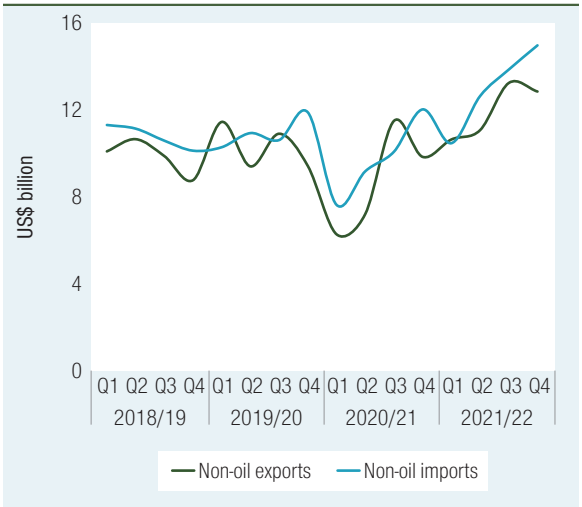
[24] For example, according to the Turkish Statistical Institute in April 2022, Iranians were the biggest investors in the real state sector in Turkey since 2020, and previously were the second largest investors in 2018 and 2019.

FIGURE 23 • Higher Oil Price and Increase in Exports Increased Share of Oil in Total Exports…



Source: CBI and World Bank staff calculations.

FIGURE 24 • …and Non-Oil Exports also Rose to a Record-High

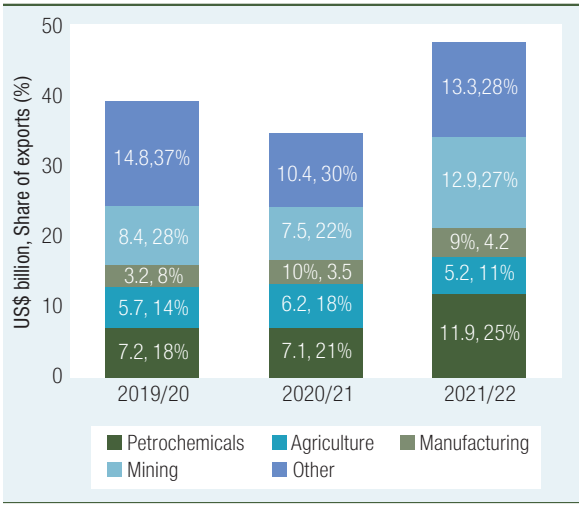


Source: Islamic Republic of Iran's Customs Administration (IRICA) and World Bank staff calculations.

mining products,[25] **which accounted for 52 percent of non-oil exports.** In 2021/22, the surge in petrochemical and mining product exports by over 70 percent compensated for a 16 percent contraction in agriculture exports due to severe droughts (Figure 25). The top destinations of Iran's non-oil ex-ports remained unchanged in 2021/22 (China 31.2 percent, Iraq 18.6 percent, Turkey 12.6 percent, UAE 10.2 percent, Afghanistan 3.8 percent), and non-oil exports increased to all except for Afghanistan, where non-oil exports declined by 21 percent (y/y). Notably, non-oil exports to China increased by over 65 percent in 2021/22 and are now 57 percent above their pre-pandemic level in 2019/20 (Figure 26).

Iran's top import partners changed in 2021/22. The top importers to Iran in 2021/22 include UAE (31.2 percent), China (24 percent), Turkey (10 percent), and Germany and Russia (less than 4 percent each). UAE replaced China as Iran's top import partner as imports from UAE grew by 69 percent.[26] India was also no longer among the Iran's major import partners and was replaced by Russia whose exports to Iran increased by 64 percent. Cell phones, essential food items such as corn, wheat, soybean, and edible oil were the main imported items.

FIGURE 25 • A Surge in Exports of Petrochemical and Mining Products Compensated for the Contraction in Agricultural Exports in 2021/22

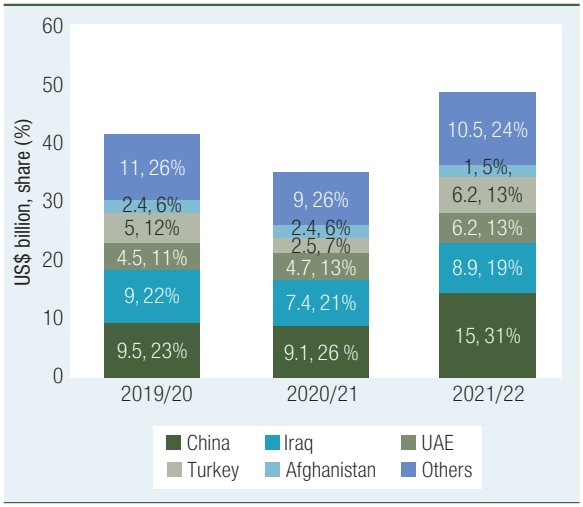


Source: Trade Promotion Organization (TPO) and World Bank staff calculations.

[25] Include other items which consist a large portion of non-oil exports.

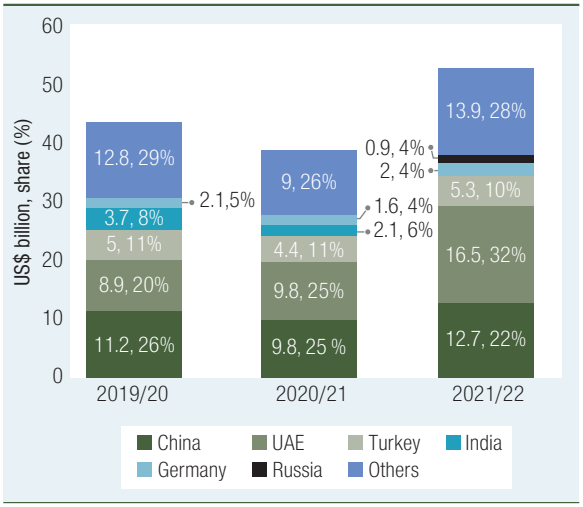
[26] It is important to note that most of the imports from UAE are only traded through the country and originate from other countries such as China. This would imply a larger share of imports based on the exact product origin for countries such as China.

FIGURE 26 • Iran's Top Exporting Destinations Remained the Same



Source: IRICA and World Bank staff calculations.

FIGURE 27 • UAE Became Iran's Main Importing Partner in 2021/22



Source: IRICA and World Bank staff calculations.

2

OUTLOOK AND RISKS

Outlook

GDP growth is projected to remain modest in the medium term as the economy continues to be constrained by global and domestic bottlenecks. Higher inflation is forecast to weigh on consumption and lead to more sluggish demand, after the initial post-pandemic rebound. The scarring effects of the pandemic, including disruptions to global value chains and rising commodity prices, will negatively impact production and demand for intermediate goods. Trade, especially oil exports, will be constrained by ongoing sanctions. Non-oil GDP growth is projected to remain below potential following previous years' declines in investment. Nonetheless, the growth forecast for 2022–24 has improved due to higher projected oil prices and oil market supply gaps that will allow Iran to produce more oil and petroleum products to meet export demand. The non-oil sector is also expected to benefit from spillovers from higher oil export proceeds.

A more favorable global oil market outlook is projected to improve fiscal and external balances. Higher projected oil prices and growth in oil export volumes are forecast to improve oil revenues. However, high growth in government expenditures due to increasing wage bill and pension spending as well as higher food import costs are projected to keep the fiscal balance in a deficit of 4.4 percent of GDP in 2022–24. The current account balance is forecast to remain in surplus in the medium term due to improved oil market conditions, despite a projected increase in imports.

Inflationary pressures are forecast to remain high, at over 35 percent per year in 2022–24, as fiscal and exchange rate pressures persist. Inflationary pressures are reinforced by the recent global surge in inflation and higher commodity prices. Sustained levels of high inflation will continue to put pressure on the livelihood of poor and vulnerable households, which have already been severely hit by the pandemic crisis and a lack of job opportunities.

The recent surge in global food and energy prices will raise the import bill and the implicit subsidy of energy and food products. Given the wide range of subsidies and administered prices in Iran, higher global food and energy prices will increase the cost of maintaining these subsidies. Gradual domestic price adjustments in line with higher global prices would help reduce the fiscal burden of higher

import prices on government finances. The effect of these price increases on lower-income households can be mitigated by well-targeted transfers using existing means testing tools and resources including the national welfare database. However, considering the recent years of high inflation and continued real income losses, any successful reform needs to be comprehensive, gradual, and complemented by a transparent public communication strategy. The government can also enhance the targeting and effective coverage of social safety nets to protect the most vulnerable throughout the price adjustment process.

Climate change and environmental challenges, if not adequately mitigated, would have a deteriorating impact on Iran's economy. Continued low precipitation and increasing temperatures will intensify current water shortages, which adversely impact agricultural products and employment and threaten food security. The Special Focus chapter highlights the significant negative impact of a scenario of water shortage and high temperature on Iran's GDP and labor demand. Extreme weather trends also increase electricity demand and reduce electricity supply through hydropower generation which add to electricity shortages and disrupt industrial production. Increased air pollution and dust storms impact economic growth and threaten people's health and productivity.

Risks and Opportunities

Iran's economic outlook is subject to significant risks. On the upside, further increases in oil prices would lead to higher oil export revenues. If global oil markets seek all available supply to ease price pressures, stronger demand could also lead to higher oil export volumes, thereby further improving Iran's fiscal and external balances. With both Iran and Russia under sanctions, higher trade and investment between Iran and Russia could reduce the impact of sanctions on Iran. Iran's oil exports to China could, however, face competition from heavily discounted Russian crude if sanctions on the two countries continue. If progress in nuclear negotiations leads to a significant easing or removal of sanctions, this could further improve Iran's economic prospects and curb inflationary expectations. Downside risks relate to the impact of surging global food prices, the resurgence of new COVID-19 variants, and a worsening of the climate change impact. Global food prices are soaring at the fastest pace ever due to the war in Ukraine, which, if prolonged, could heavily impact crop and fertilizer supplies. Higher imported commodity prices would lead to a further increase in Iran's import bill and put more pressure on the government and its limited accessible foreign exchange reserves. The resulting inflationary pressures, if unmitigated, would increase pressures on lower-income deciles and add to social grievances.

Adaptation and mitigation policies are an increasingly urgent priority to address Iran's climate change challenges. Addressing depleting water resources and overextraction from scarce groundwater sources is more crucial than ever. This requires improved demand management via price signals and increased efficiency. The special focus chapter of this report outlines four main pathways to water security for Iran, including on better resource management and other policies that can help address the climate change impact of Iran's water shortage challenges. In addition, highly subsidized energy prices have promoted intensive energy use and have turned Iran to one of the highest per capita energy consumers in the world, including through high gas flaring (the third highest in the world). Given the adverse effects of intensified air pollution and dust storms on the health and daily life of Iranians, the government could introduce regulations and environmental levies, and realign energy prices to incentivize new investments in cleaner production processes especially in steel, cement, and petrochemical sectors. Finally, the preparation of a blueprint for Iran's economic transition out of fossil fuel dependence would allow the country to be ready for the global shift towards net-zero goals.

Addressing the above-mentioned challenges requires a comprehensive package of economic reforms that needs to be complemented by an adequate social protection system. Economic policies could be better geared towards creating much-needed jobs. This could be achieved through

investment in infrastructure, especially in under-developed regions, stimulating private sector activity via an improved business environment, and reducing distortive pricing interventions. De-carbonizing infrastructure, a transition towards sustainable sources of energy, and accelerated adoption of climate-smart water and agriculture interventions will also be key in managing climate change risks. Rightsizing current expenditures, including reforming domestic energy price subsidies, and increasing tax revenues through the removal of exemptions, addressing tax evasion, and improving value-added tax collection can create much-needed fiscal space. Relatively low public debt allows the government to finance its deficit by issuing government bonds within a well-defined medium-term fiscal framework; this reduces reliance on the banks' resources or the central bank's balance sheet. To rein in inflationary pressures, monetary policy needs to be less accommodative. To address the income and distributional impact of these policies, the most vulnerable households would need to be protected through well-targeted social safety transfers.

TABLE 2 • Selected Economic and Financial Indicators, 2019/20-2024/25

	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
	Act.	Act.	Est.	Proj.	Proj.	Proj.
Real sector	(Annual percentage change, unless otherwise stated)					
Real GDP at market prices	-6.8	3.4	4.7	3.3	2.5	2.1
Real GDP per capita	-6.5	3.6	4.4	3.3	2.5	2.1
Real non-oil GDP	-8.0	2.1	3.4	2.1	1.4	1.0
Real oil GDP	1.1	2.5	3.5	2.9	2.3	1.9
Crude oil production (mbpd)	-38.7	11.2	10.1	5.5	3.5	3.0
(GDP supply side components)	2.4	2.0	2.2	2.3	2.4	2.5
Agriculture						
Industry (including oil)	8.8	4.5	-2.6	1.6	1.4	1.3
Services	-15.9	8.4	3.2	3.1	2.3	2.0
(GDP demand side components)	-0.5	-0.1	6.5	3.7	2.8	2.3
Private consumption	-7.7	-0.4	3.9	2.4	1.8	1.6
Government consumption	-6.0	-2.3	8.3	3.6	3.4	2.9
Gross fixed capital formation	-5.9	2.5	0.0	3.7	1.7	0.9
Exports, goods and services	-29.9	-5.4	5.2	4.9	4.4	3.9
Imports, goods and services	-38.1	-29.2	24.1	4.4	3.8	3.2
Money and prices						
Oil price (US$/bbl)	68.0	61.0	41.0	96.7	84.0	77.4
CPI Inflation (p.a.)	41.3	36.4	41.1	51.2	42.6	36.5
Monetary base (MB)	32.8	30.1	31.6	n/a	n/a	n/a
Broad money (M2)	31.3	40.6	39.0	n/a	n/a	n/a
Banking system credit	26.0	94.8	56.3	n/a	n/a	n/a
Nominal interest rate (percent)	18.9	17.5	19.6	n/a	n/a	n/a
Nominal exchange rate, parallel market (IRR/USD)	129,183	228,872	259,476	n/a	n/a	n/a

(continued on next page)

TABLE 2 • Selected Economic and Financial Indicators, 2019/20-2024/25 *(continued)*

	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
	Act.	Act.	Est.	Proj.	Proj.	Proj.
	(Percent of GDP, unless otherwise stated)					
Investment & saving						
Gross capital formation	31.0	32.8	33.3	33.3	33.2	33.1
Gross national savings	32.5	32.5	36.4	37.5	36.2	36.0
Government finance						
Total revenues	10.8	9.1	11.0	11.6	12.1	12.3
Tax revenues	6.6	5.9	6.1	6.4	6.6	6.7
Total expenditures	15.9	15.4	16.3	16.3	16.4	16.4
Current expenditures	13.8	13.2	13.8	13.8	13.9	13.9
Net lending/borrowing (overall balance)	-5.0	-6.3	-5.3	-4.7	-4.4	-4.1
External sector						
Current account balance	1.5	-0.3	3.1	4.1	3.0	2.9
Population and labor market						
Population (million)	82.9	84.0	85.0	86.0	87.0	87.9
Participation rate (percent)	44.1	41.3	40.9	n/a	n/a	n/a
Unemployment rate (percent)	10.7	9.6	9.2	n/a	n/a	n/a
Memorandum Items:						
Nominal GDP (IRR billion)	24,412,570	35,084,726	52,896,540	77,591,818	110,548,943	153,503,840

Source: Iranian authorities and World Bank staff calculations.

SPECIAL FOCUS CHAPTER: PREPARING FOR AN UNCERTAIN WATER FUTURE

Iran is a water-stressed country whose consumption of water resources outstrips natural regeneration. Climate change will widen the water supply and demand gap, worsening the water challenges for Iran and its neighbors. Irrigated agriculture consumes the greatest share of water in the country (92 percent), but that water is not used well: agricultural water productivity is one of the lowest in the region. Climate change will negatively affect the gross domestic product (GDP), demand for labor, and food prices. Since reduced water availability is one of the biggest economic impacts of climate change, Iran can benefit from lessons from countries that have coped with this issue. These pathways include (i) effective water resources management, (ii) improved water use efficiency with water demand management policies, (iii) adept institutions and tailored policies, and (iv) collaboration with riparian countries.

Water Stress and Climate Change

Water resources in Iran are under stress because the annual water consumption, estimated at 96 billion cubic meters, is about 8 percent more than estimated total annual renewable water resources. The nation's rainfall has spatial variability: from less than 50 millimeters in the deserts and central plateau to more than 1,600 millimeters near the Caspian Sea. The average annual rainfall is an estimated 400 billion cubic meters, and total annual renewable water resources is around 89 billion cubic meters.[27] The multiyear water availability depends on

[27] It is worth noting that while Mesgaran and Azadi 2018 provide an estimate of 89 billion cubic meters, Food and Agriculture (FAO) AQUASTAT database provides another estimate of 137 billion cubic meters; see

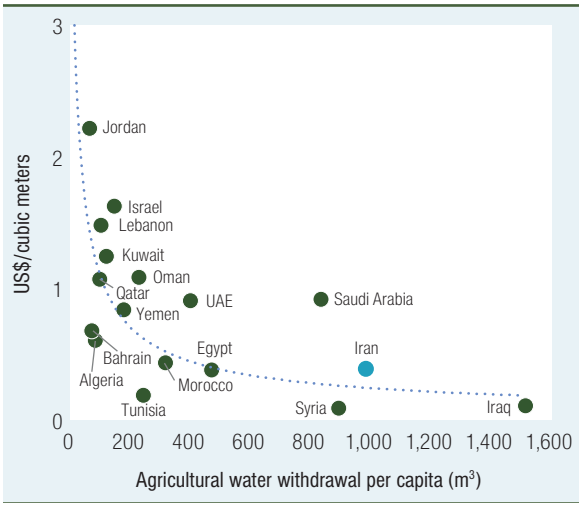
the dams' operating rules and storage capacity (52 billion cubic meters). Water availability has decreased in the last few decades due to population growth, economic development, and climate change impacts. The water depletion index, defined as the ratio of water consumption to replenishable water resources, recommends a threshold of 0.75 to identify regions with water depletion problems. Iran's water depletion index is 1.08, indicating severe water depletion.

Agriculture consumes the highest share of withdrawal, estimated at 92 percent. Iran has one of the lowest water productivities in the region and the second highest agricultural water withdrawal per capita (Figure 28). About 7.2 percent of the territory is cultivated, and water consumption is about 92 percent (compared to a 70 percent global average). Irrigated agriculture represents 68 percent of the agriculture sector, yet only about 5 percent of the irrigated area uses modern irrigation technology. Municipal water uses about 6.6 percent, and 1 percent is used by industries.

Iran is overusing its surface water and groundwater, and water quality is degrading. In the west, Lake Urmia—the largest lake in the Middle East and one of the world's largest hypersaline lakes—has shrunk by about 88 percent since the 1970s. This trend is seen in several water bodies throughout the country. Iran had one of the highest groundwater depletion rates in the world at the beginning of the 21st century.[28] Groundwater overuse occurs in around 77 percent of the territory and lowers groundwater levels, increasing soil and groundwater salinity problems and land subsidence. In addition, about 75 percent of the wastewater is returned untreated into the environment, creating a further contamination risk of surface water and groundwater resources—and health hazards for people and ecosystems.

Climate change impacts on rainfall and temperature will further reduce water availability and affect economic sectors dependent on water. Climate change projections using the outputs of 17 Global Climate Models, based on temperature and historical data (1971–2015), show that under two emission scenarios, RCP4.5 and RCP8.5, temperatures will increase, and rainfall levels will decrease. Under the RCP8.5 scenario, the annual mean temperature is expected to increase by 1.9°C and 3.3°C for the periods of 2041–70 and 2071–2100, respectively. Annual mean precipitation is expected to decrease by –5.4 percent and –9.5 percent for the periods of 2041–70 and 2071–2100, respectively. Monthly precipitation regimes are expected to change across the country, especially in the Caspian Sea coastal regions and the Alborz Mountain range. The next section models the economic impacts of climate change through reduction of water availability on all the sectors and temperature impacts on agriculture through 2050.

FIGURE 28 • Agricultural Water Productivity and Per Capita Water Withdrawals in MENA (2018)



Source: World Bank, forthcoming.

Economic Impacts of Climate Change through Reduced Water Availability and Temperature Impacts on Crop Yields

Water scarcity is affecting the Middle East and North Africa (MENA) region, and improving water management practices can lead to significant benefits. Inadequate water supply and sanitation

https://www.fao.org/aquastat/statistics/query/results.html, consulted on April 7, 2022. For this note we use estimate of 89 billion cubic meters.

28 Other countries in the list: India, the United States, Saudi Arabia, and China.

BOX 3 DESCRIPTION OF THE GTAP-BIO-W MODEL AND SCENARIOS

The GTAP-BIO-W model developed by GTAP is the computable general equilibrium model that uses water as an input to capture economywide impacts—including changes in prices, quantities, and incomes—that are affected by fluctuations in goods and services. The model can assess the economywide impacts of changes in water scarcity. This model traces demands for and supplies of all goods and services produced, consumed, and traded at a global scale by country. It considers resource constraints and models the allocation of limited resources—including labor, capital, natural resources, water, and land—among their uses. This model divides crop production into rainfed and irrigated, and it traces supplies of water and land resources and their demands at the spatial resolution of River Basin-Agro-Ecological Zone (RB-AEZ) in each country or region. The benchmark database used in this modeling includes (i) input-output (I-O) table; (ii) global data on trade by commodity (aggregated to several categories); (iii) land use data at the RB-AEZ level; (iv) crop production and harvested area at RB-AEZ level; and (v) water consumption by users at the RB-AEZ level.

The model simulates six scenarios—over the baseline of 2016 economic parameters—that portray the Iran's economy under different reductions of water availability and impacts of temperature on crop yields. Three scenarios consider the impact of reduced water availability. Scenario 1 (S1) is a reduction in water supply by 5 percent; scenario 2 (S2), by 10 percent; and scenario 3 (S3), by 20 percent. The fourth scenario (SC) considers the joint impacts of reduced water supply by 20 percent (S3) with changes in crops due to temperature. SC10% and SC20% capture the mitigation effects of water usage efficiency (WUE) improvement by 10 percent and 20 percent, respectively, to the SC scenario. (World Bank 2020).

cost is about 1 percent of regional GDP in MENA annually. Improving how water for irrigation is stored and delivered could lead to an estimated US$10 billion welfare gain annually. If all the available surface water allocated to agriculture were stored and delivered efficiently to irrigated agriculture, agricultural production would increase 1 percent to 8 percent, depending on the country. Countries that could reap the greatest relative benefits from improved water management are Egypt, Iran, and Syria—which is not surprising, given that they have the largest proportion of irrigated areas in the region (World Bank 2018).

Climate change is increasing water scarcity—affecting rainfall patterns and temperatures—and its impact will only worsen. Water is vital for production and underpins all economic activity, from agriculture to manufacturing to human and natural capital. A lack of water can spark social unrest[29] and slow economic progress. The projected temperature increase will change crop yields, especially affecting agriculture-dependent economies. This section presents a deep dive into the main findings relevant to Iran in *Water in the Balance* (World Bank 2020), which applies an extended version of the Global Trade Analysis Project (GTAP) computable general equilibrium model to assess the economic impacts of climate change.[30] This analysis relies on short to medium time horizons of the changes in crop yields and water availability. Thus, it focuses on changes that are highly likely to happen before 2050. The main components of the model and the analyzed scenarios are described in Box 3.

One of the biggest economic impacts of climate change is driven by reduced water availability. Under S3, which simulates a reduction of water availability by 20 percent, the GDP drops by about 5.3 percent. Under SC, which simulates the reduction of water availability by 20 percent and the temperature impact on crop yields, the GPD drops by about 7.2 percent. Therefore, the temperature impact is less significant than the impact of reduced water availability (Figure 29).

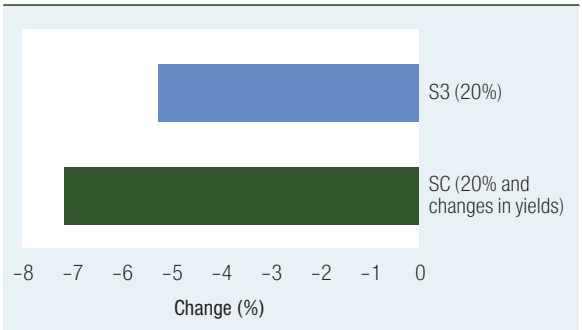
Climate change will severely curtail economic production and reduce the state's fiscal capacity, yet WUE[31] can partially mitigate the impacts. The economywide impacts of climate change include consequences for agricultural and nonagricultural activities (the primary effects) and their interactions with capital (secondary effects) and labor markets (tertiary effects). The simulation shows that

[29] Water shortages in the southwest Khuzestan Province sparked large protests in July 2021, which have spread across the country, occasionally turning violent.

[30] The economic modeling does not consider the impacts of CO_2 levels on crop yields nor the temperature impacts on other sectors of the economy.

[31] In this note WUE comes from modernized irrigation.

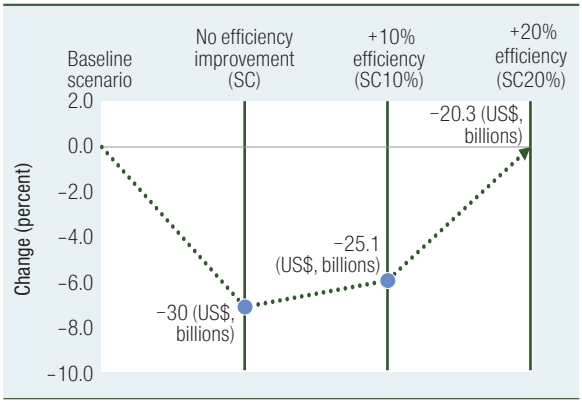
FIGURE 29 • Changes in Real GDP under Reduced Water Availability Scenarios S3 and SC in Iran by 2050



Source: World Bank 2020.
Note: Scenario S3 is the reduced water availability scenario by 20 percent. Scenario SC considers the joint impacts of reduced water supply by 20 percent (S3) with changes in crops due to temperature.

when decomposition the impacts on the GDP of these three effects, the second effect is the highest contributor to the drop in GDP. Effective WUE measures would partially mitigate the climate change impact. For example, a 20 percent reduction of the water supply and temperature impact on crop yields (SC scenario) could trigger a drop in the GDP of more than 7 percent compared with the 2016 levels, equivalent to US$30 billion, and a 20 percent increase in WUE (SC20% scenario) would shorten the GDP drop by 2.32 percent, or US$10 billion (Figure 30). To gain

FIGURE 30 • Changes in the Real GDP with and without Water Use Efficiency in Iran 2050



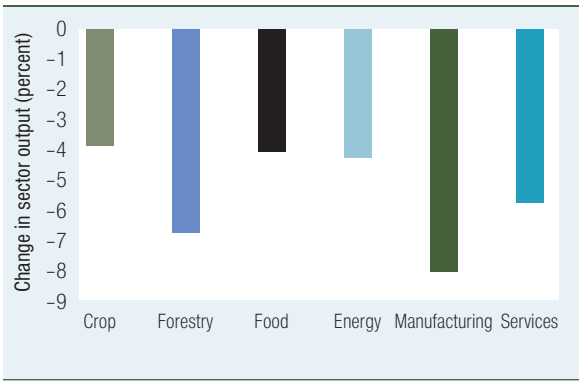
Source: World Bank 2020.
Note: Scenario SC considers the joint impacts of reduced water supply by 20 percent (S3) with changes in crops due to temperature. SC10% and SC20% capture the mitigation effects of water usage efficiency improvement by 10 percent and 20 percent, respectively to the SC scenario.

WUE, new investment is required and was not estimated as part of this modeling.

The impact of climate change will affect the water-dependent industrial and services sectors (Figure 31). Electricity producers, petrochemical facilities, and services, among many others, will not be able to operate at full capacity with lower access to water. Interlinkages between sectors mean that disruptions in agricultural production caused by climate change ripple through supply chains, affecting manufacturing and services sectors. This spillover generates negative feedbacks activities that provide inputs for agricultural activities or process agricultural products.

Climate change is expected to decrease the demand for labor, increasing challenges in an already stagnant labor market and affecting poor households disproportionately.[32] The impact of reduced labor is more significant in nonagricultural activities (Figure 32). Climate change reduces irrigation and related demand for work; however, the simulation shows an increase in rainfed crops, increasing demand for labor and compensating a portion of the reduced demand in agriculture. Although the percentage change is smaller for agricultural

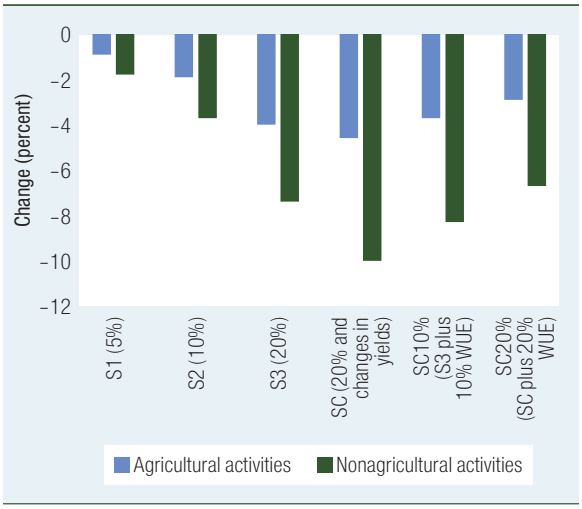
FIGURE 31 • Impacts of Reduced Water Availability (S3) on Sectoral Outputs in Iran by 2050



Source: World Bank 2020.
Note: Scenario S3 simulates a reduction of water availability by 20 percent.

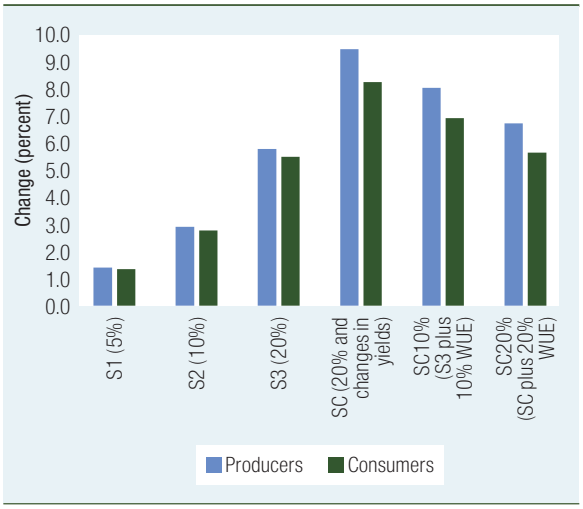
[32] The increases in crop and food prices only reflect the price impacts of water scarcity and reductions in crop yields and are abstract from the increases form general inflation.

FIGURE 32 • Changes in Demand for Unskilled Labor in Agricultural and Nonagricultural Activities in Iran



Source: World Bank 2020.
Note: Scenario S1 is a reduction in water supply by 5 percent; S2, by 10 percent; and S3, by 20 percent. SC considers the joint impacts of reduced water supply by 20 percent (S3) with changes in crops due to temperature. SC10% and SC20% capture the mitigation effects of water usage efficiency (WUE) improvement by 10 percent and 20 percent, respectively, to the SC scenario.

FIGURE 33 • Impacts of Climate Change on Crop Price Index for Producers and Consumers in Iran by 2050



Source: World Bank 2020.
Note: Scenario S1 is a reduction in water supply by 5 percent; S2, by 10 percent; and S3, by 20 percent. SC considers the joint impacts of reduced water supply by 20 percent (S3) with changes in crops due to temperature. SC10% and SC20% capture the mitigation effects of water usage efficiency (WUE) improvement by 10 percent and 20 percent, respectively, to the SC scenario.

labor, unskilled labor makes up a significant share of the agricultural labor market. Thus, a lower reduction rate is connected to a large body of unskilled labor in agricultural activities. In nonagricultural activities, several important and large-scale industries are in areas with significant water scarcity. Climate change will have further effects, resulting in a substantial reduction in outputs (Figure 31) and, hence, demand for labor (Figure 32).

Food prices are expected to increase because of climate change, affecting poor households disproportionately. Producer and consumer price indexes will increase by 9.4 percent and 8.2 percent, respectively, in the SC scenario (Figure 33). Beyond food prices, climate change disruptions have negative impacts on income, which could face a 9.8 percent and 8 percent decline under the same scenario, and a higher dependency on food imports due to lower crop yields.[33] Increased food prices and a decline in wages would occur in a reduced fiscal space—in a context in which many low-income households spend a high share of their incomes on food products—which may have a significant impact on poverty. The subsidized exchange rate for the imports of food items has so far partly offset the passthrough from the exchange rate depreciation. It has, however, restricted the fiscal space and gradually become less effective due to the growing gap with the parallel market rate which incentivizes smuggling and misallocations.

WUE and climate-smart agriculture[34] measures can partially alleviate the burden of climate-driven water scarcity but must be accompanied with demand management policies to ensure water saving. Increasing the efficient use of water can mitigate part of the severe economic consequences of climate change. WUE measures need to be implemented

[33] This last impact was felt in 2021: the country faced its worst drought in 50 years leading to a 60 percent increase in wheat imports by weight and a 92 percent increase by monetary value, compared to 2020. These increases added pressure to the country's finances, especially because of high global grain prices (Iran Chamber of Commerce, Industries, Mines and Agriculture 2021).

[34] Climate-smart agriculture (CSA) is an integrated approach to managing landscapes—cropland, livestock, forests, and fisheries—to address the challenges of food security and climate change.

with water demand management policies to avoid an increase in water consumption known as the "rebound effect." Indeed, the simulations show that without constraints in the withdrawals, a 10 percent increase in WUE would cause total water consumption to increase, thus canceling any water savings. Improvements in WUE require new investments in water infrastructure, water distribution systems, and at the consumption level.

Looking Forward

Since one of the biggest economic impacts of climate change is driven by reduced water availability, Iran can learn from countries that have coped with reduced water availability. The pathways that contribute to water security are (i) effective water resources management, (ii) improved water use efficiency and water demand management policies,[35] (iii) adept institutions and tailored policies; and (iv) enhanced regional collaboration among riparian countries.

Pathway 1: Effective Water Resources Management for Enhanced Flexibility to Adapt to Changes in the Water System

With effective water resources management[36] **the institution in charge of water can better cope with changing conditions such as droughts or changes in the hydrology,** and governments can deliver results that align with their policies. In Australia, effective water resources management of the Murray-Darling Basin was tested through climate change, when flows started averaging less than 40 percent of the long-term average. In response, the basin authority reevaluated water rights and redefined entitlements. In China, the "three red lines" caps total national water use, water use efficiency, and pollution levels. The central government sets national caps as future targets. Then jurisdictional authorities propose caps for the central government's approval at the basin, province, prefecture, and county levels (World Bank, forthcoming). Because of reforms in the water sector between 1990 and 2010, China has stabilized its water use. Achieving effective management takes time and often requires infrastructure and major institutional and entitlement changes. The reforms in China were implemented over 20 years. Even when effective management is achieved, shocks in the system, such as multiyear drought, require updates.

Water use accounting and monitoring are critical for effective water management. Governments use water accounting and monitoring to plan and assess water management alignment with national policies and the impacts of shocks on the water system. Agriculture is the main sectoral user of fresh water worldwide; however, most agricultural water use is not monitored. There is limited metering of irrigated agriculture despite increasing pressure on groundwater and surface water resources. As competition over limited water resources increases, many policy makers seek to limit irrigated agricultural water withdrawals and incentivize improvements in water productivity. Disruptive technologies, such as remote sensing, can help improve water accounting and monitoring. In France, satellite monitoring of irrigated areas spot-checks individual groundwater users' compliance with authorized quotas against self-reported data that farmers provide.

Pathway 2: Improved Water Use Efficiency with Water Demand Management Policies to Cap Water Use

Decoupling a country's economic growth from its water use, through increasing water use efficiency, can partially shield the economy from the climate change impact of reduced water availability. Monitoring the economic output per water unit is crucial when developing agriculture where water

[35] In this note, water demand management policies refer to policies that affect consumers' use of water: water pricing, quotas, shifting from high water intensive crops to low water intensive crops, water accounting and monitoring, use of transformative technology to support water governance monitoring and enforcement, and strategic communication.

[36] In this note, *effective water resources management* is when the observed outcome for each user is consistent with declared policy at national, regional, or local levels.

and market are the limiting factors. Spain, one of the most water stressed industrialized countries in the world, the second water scarce country in the world, is striving to improve the water efficiency and has increased the water productivity over time. There was significant improvement of economic outputs per unit for industrial and agricultural water from 1987 to 2017. Spain optimized surface water use for municipal and agricultural water customers, and increased reuse of treated wastewater instead of freshwater in agriculture (45 percent), irrigation of parks and recreational areas (36 percent) and industry (10 percent) among other uses. These actions can help maintain a level of agriculture that plays an essential sociocultural role and provides a lifeline to some marginalized economic groups.

Complement supply-side water policies[37] **(such as dams, reduction of leakages, and re-use of treated wastewater) with increased water valuation (through economic instruments such as tariffs and quotas).** Extensive literature shows that increasing the water supply can generate a higher demand, which can aggravate water scarcity. Better water valuation, including strategic communication to support users' behavior change, helps manage the water demand. Tariff structures for domestic water need to cover operations and maintenance costs while ensuring vulnerable households can afford the services. The Gironde area of France implemented a water conservation policy that included an awareness campaign and a program to reduce leaks in domestic water distribution networks to reduce water use in the deep Gironde Aquifer. The policy was effective, as shown through a reduction of almost 10 million cubic meters in abstracted drinking water between 2005 and 2013, even though the population increased by about 120,000. Capping the demand with tariffs for domestic water and industrial uses and having quotas for agriculture provided incentives for users to lower their water use. Across MENA there is a correlation between higher domestic water tariffs and lower per capita water use, except in countries such as the Republic of Yemen, which has absolute supply constraints.

Increasing water use efficiency will cap water use only if implemented with water demand management policies. As competition over limited water resources increases, policy makers seek to limit agricultural water withdrawals and incentivize improving irrigation water efficiency. The promise of efficiency improvement investments is to "save" water and allow for its reallocation to cities or to the environment. However, global evidence shows that farmers often use the "saved" water to irrigate more area, increase cropping intensity, or switch toward thirstier crops. The result is often an increase of water withdrawal called the "rebound effect."[38] Water demand policies require a better valuation of water, including water accounting and monitoring, and strategic communication to support users' behavior change to reduce consumption. Policies and interventions range from volumetric pumping quotas, power rationing, taxes on extraction, reforms in water pricing, and water markets. Transformative technology (such as remote sensing and smart meters) allows cheaper and faster information collection and processing to support monitoring users' compliance with water demand management policies. Sanctions and penalties must accompany accounting and monitoring to deter noncompliance and rule breaking. In Nebraska, a local governing body has revoked groundwater rights to irrigators caught attempting to bypass flow meters. Enforcement is difficult—and there are limited examples of success—but it is critical. If users perceive that the cost of noncompliance to water restriction is lower than the cost of compliance, users will deplete the water resources.

Using the latest decision-making methodologies can improve infrastructure benefits and

[37] In this note, *supply-side water policies* refer to water resource augmentation interventions such as increasing storage capacity, desalination, agriculture drainage water reuse, and wastewater reuse; increasing efficiency and water productivity; reduction of nonrevenue water; reduction in water leakages (distribution network and transfers); and modernizing irrigation.

[38] *Rebound effects* encompasses economic and behavior adaptation mechanisms that occur when an increase in resource use efficiency affects the total consumption of that resource.

increase resilience to droughts and floods. As the system gets more complex, decision-making in infrastructure operation needs to shift from a reliance on historical data to estimates based on forecasting and real-time data. Many countries update their dams' operation to accommodate flood volumes and determine the water allocations during drought events. Agile water allocation and flood and drought response mechanisms preserve economic development and prevent seasonal or annual losses in sectors dependent on water. The shift in managing Italy's Lake Como from historical data to a forecast approach reduced floods and water scarcity and increased hydropower production.[39] The United States Corps of Engineers developed the Forecast Informed Reservoir Operations (FIRO)[40] to increase water supply reliability without reducing flood protection capacity and environmental flows. The final viability assessment for California's Lake Mendocino shows that the use of FIRO in 2020, the third driest year over a 127-year record, enabled a 19 percent increase in water storage by the end of winter.

Pathway 3: Adept Institutions and Tailored Policies to Incentivize Water use Efficiency and Capping Water Use

Policy makers need to take complementary actions, such as robust trade agreements, to improve resilience to water scarcity. However, inadequately designed energy, agriculture, and trade policies can affect the water sector. Availability and transparency of water accounting, monitoring, and use of information can help to pinpoint unintended consequences on water resources from policies in and outside the water sector. Energy subsidies are types of policies that have led to the unintended consequence of groundwater overuse. For example, electricity subsidies in India between 1995 to 2004 led to groundwater overuse and the production of more water intense crops. On trade and food security, water-scarce countries like Jordan have focused on policy options to build strategic reserves and improve the efficiency of supply chains and reduced their production of thirsty crops.

Increased local stakeholder engagement can better inform policy decisions in identifying sectoral requirements and priority areas for water reallocations, while ensuring just and equitable distribution. Including important local actors from multiple sectors supports coordination between competing water uses. With water supply and sanitation service delivery, stakeholder engagement can improve customer satisfaction with services, which could trigger a virtuous cycle of increasing locally generated revenue from customers. Stakeholder engagement can help to build trust in water sector institutions and generate user support for and compliance to decisions regarding shared water resources—perhaps setting the stage for broader-scale cooperation.

One of the global consequences of institutions failing to perform adequately in the water sector is groundwater overuse; therefore, many countries have regulated groundwater use regimes to stabilize or reverse the overuse. The most common regulated groundwater use regimes include (i) command-and-control,[41] (ii) market approaches with the definition of property rights,[42] and (iii) decentralization of water allocation policies,[43] whereby user

[39] A comparison of the deterministic and probabilistic approach results for the historical data (1981–95) show (i) a reduction of 30 percent in the flood frequency of downstream of Lake Como, Italy; (ii) a reduction of the water deficit of 110 million cubic meters per year (12 percent); and (iii) an increase of 3 percent in electricity production.

[40] FIRO is a reservoir-operations strategy that better informs decisions to retain or release water by integrating flexibility in operation policies and rules with enhanced monitoring and improved weather and water forecasts.

[41] Command-and-control instruments aim to affect target group behavior through state intervention. They establish or reinforce direct administrative regulation, with systematic registration of abstraction points, issuing pumping permits and awarding and enforcing individual volumetric quotas.

[42] Market approaches with the definition of property rights are based on private appropriation of the resource and involve allocating water use rights traded among users.

[43] The decentralization of water allocation policies entails devising several state responsibilities to water users, communities, or associations.

associations apply local rules for groundwater management. The command-and-control regulated groundwater use regime has not reversed the problem. The main constraints are that (i) the institutions often lack human resources to inspect a significant proportion of users, and (ii) fines imposed are usually kept low for political reasons. Thus, many countries have transitioned out of the command-and-control system. France transitioned to a decentralization of water allocation policies. The total volume to extract from an aquifer is capped, and this volume is shared among users. Local groundwater user associations share available water among farmers. China transitioned to market approaches using tradable quotas. These transitions often start with experiments and pilots, allow a tailored approach to the local context, and gradually scale up.

Pathway 4: Collaboration with Riparian Countries to Improve Water Use at Basin Level

Collaboration includes increased information sharing among the riparian countries on water quantity and quality. More coordinated management and operation of water infrastructure on shared river systems could increase benefits such as energy generation. For example, in the Zambezi River Basin, a multisectoral economic evaluation and modeling of water resources development showed that cooperative development could increase hydropower outputs. Within this cooperative scenario of coordinated operation of hydropower facilities, an increase of firm energy generation by 7 percent can be achieved with no major infrastructure investment, leading to a net positive value of US$585 million over a 30-year period. Information sharing and the development of monitoring and early warning systems promote the cooperative operation of water infrastructure, allowing riparian states to make better decisions on storage or release of water in the dams and improve drought and flood resilience.

Cooperation on shared water resources between countries globally ranges from joint operation of infrastructure to exchange of information. The Senegal River Basin Organization owns infrastructure and operates it on behalf of other countries based on benefit sharing agreements. Other basins, such as the Mekong, have developed information and best practices exchanges among the riparian states. Some regions have developed subbasin institutions or projects according to the subsidiarity principle that activities should occur at the lowest appropriate governance level. One example of a subbasin project is the Rusumo Falls hydropower dam, benefitting Burundi, Rwanda, and Tanzania.

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