Working paper | Paper 1

Food security in Yemen: the private sector and imported food

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Key messages

Most food in Yemen is imported, processed and distributed by a small number of private conglomerates. This paper describes the historical development of the food import trade in a predominantly rural and agrarian country which has undergone a succession of harsh economic and agrarian transitions. These transitions have left Yemenis dependent on markets for food, and pushed many food producers to the impoverished margins of the market.

Food import dependence has increased with each transition, and this dependence has deepened food insecurity. Since the start of the conflict, import restrictions and a foreign exchange crisis in Yemen's fragmented and under-resourced financial systems have aggravated food insecurity.

This report uses customs and agricultural production data to quantify import dependence in 2020, estimating that four-fifths of available calories are imported. The report argues that Yemen's large conglomerates need macro-economic stability and access to foreign exchange to maintain this vital supply of imported food.

Smaller retailers and wholesalers, even more deeply affected by foreign exchange shortages, also need support. But support to the private sector is not enough to end food insecurity, the underlying causes of which are the collapse in purchasing power, and the linked decline in domestic agricultural production. In the long term, Yemen's food producers need support to increase production, build up rural livelihoods, and increase purchasing power across the population.

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I am sorry that the security situation in Yemen does not permit mention of so many thoughtful and brilliant Yemeni scholars and researchers who, along with named research participants, made this report possible.

About this publication

This publication is part of a series of papers produced by ODI for UN OCHA and UNDP, which aim to generate evidence for action which can contribute to reducing food insecurity in Yemen.

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Executive summary

Imported food accounts for about two-thirds of the total available volume of food in Yemen, about four-fifths of total available calories and almost 90% of total available cereals. Import dependence is increasing, making Yemen's food systems more vulnerable to price shocks and foreign exchange shortages. This paper looks at how Yemen has arrived at such an extreme situation of dependence on imported food, and how imports – and food imports in particular – have shaped the private sector. It focuses on wheat imports – which probably accounted for almost half of food imports in 2020, and almost a quarter of all imports – to describe how imported food has shaped food systems and food insecurity.

In the 1960s, Yemen was largely rural, and produced most of the food it consumed. In that decade, a civil war in the north and a liberation war in the south unsettled rural Yemen and set in train a dizzying succession of transitions. A remittance economy which aimed to integrate Yemen into Gulf labour markets was replaced in the 1990s by a petroleum economy accompanied by a debt crisis and structural adjustment programmes. Global food price shocks in 2007 came during a sharp decline in oil production leading to austerity measures and a thwarted democratic transition, which in 2015 turned into a bloody conflict. At every turn, wheat imports rose, and wheat importers – conglomerates that sit at the apex of Yemen's top-heavy and narrow formal private sector – entrenched their influence.

The interests of the handful of conglomerates and companies that dominate Yemen's formal private sector are focused on the import trade and the captive market that wheat imports have generated. Food imports now account for two-fifths of all imports. But together, available imported and domestically produced food is not enough to feed the population – this paper roughly estimates that available food amounts to less than 1,800 kilocalories per person per day – far below minimum food intake. Food is not sufficiently available because purchasing power has collapsed, as a result of economic contraction, non-payment of salaries, depreciation of the currency, and conflict costs; importers will not import goods that they cannot sell.

Yemen's food deficit reflects the structure of its food supply system, which predates the current conflict, even as the conflict has deeply aggravated food insecurity. Import conglomerates have been able to switch from more expensive to cheaper foods to address reduced

purchasing power – but the private sector as a whole is not able to build purchasing power.

Although reduced purchasing power is the main driver of food insecurity in Yemen, there are a number of food supply problems as well. First, domestic production has declined sharply in volume and value. Second, imported food supply leaves Yemen vulnerable to external shocks and prevents the emergence of alternative food systems. Third, although conglomerates appear to have an astonishing financial and logistical depth, allowing them to survive the multi-dimensional crisis, the same may not be true for the thousands of food wholesalers and retailers who are equally indispensable to food security.

Yemen's food import system is vital to the immediate survival of the country's people, and policy-makers need to study the risks the system faces. Six main risks are outlined in this paper:

- Low purchasing power: consumer purchasing power has been deeply diminished by conflict and economic crises – but low purchasing power is structurally linked to Yemen's agrarian transition. Millions of Yemeni producers grow food for their own consumption, at the margins of the market. They are also dependent on imported food, but do not have the means to purchase it.
- Changing relationships between smaller and larger traders: the biggest conglomerates have weathered the crisis and probably concentrated their power. But they do not provide credit to smaller wholesalers and retailers, who now need to finance their operations in foreign exchange, and in some areas are going out of business.
- Access to foreign exchange: Yemen's commercial banks, closely linked to the big import conglomerates, are in a crisis of liquidity and can no longer supply importers with foreign exchange. Poorly regulated foreign exchange bureaus, often linked to political and security interests, supply much of the foreign currency in the country, imposing substantial costs on traders.
- Yemen's dual currency system: Yemen's Central Bank has split in two: the Aden and Sana'a branches pursue rivalrous monetary policies and this dual currency regime complicates financial management for companies and conglomerates working across both currency zones, and for everyone who depends on them.
- Access to credit for smaller traders: credit arrangements vary between Yemen's two currency zones. Where Yemeni rials are issued by the de facto authorities in Sana'a, some food wholesalers and retailers are able to access credit to finance their commercial operations. Elsewhere, credit may be harder to come by.

- The difficulties faced by new entrants to the food system: Yemen's narrow and top-heavy food import system inhibits competition and limits the ability of the food system to develop and improve.

Smaller traders and apex conglomerates face different risks. But while the conflict presents new dangers to smaller traders, it is quite possible that it will entrench the dominance of the biggest conglomerates. They are positioned to benefit from the momentum towards wheat dependence, because conflict immiseration is pushing Yemenis towards the cheapest foods. They are able to work across frontlines, and manage relations with rival authorities. But demand is depressed, and these traders are not able to generate new business models which could stimulate demand and potentially generate greater profits. Instead, their energies are focused on their captive market of hungry food consumers. They have little incentive to invest in risky productive activities as long as trading profits are steady. But the trading system that they run has not and probably cannot deliver food security to the population. Intervention from the state, with the support of the international community, is needed.

It is vital that the food import system continues to function in the short and medium term, and international actors need to support this system. However, support should be aimed not so much at individual firms, but at improving efficiency and competitiveness. Stabilisation of the macro-economic situation is a key objective for the short and medium term, along with support for smaller actors facing credit and logistics barriers.

In the long term, Yemen needs to build up consumer purchasing power and develop domestic food production in order to ensure food security. Support to the private sector needs to ensure that the long-term aim of food security remains the priority. It is possible to envisage a strategy which integrates support to domestic production, rural livelihoods and purchasing power. Some ideas for such a strategy are set out in a companion paper on domestic production (Thomas, 2022).

Introduction

The conflict that began in 2015 has increased Yemen's already extremely high dependence on food imports. Food security studies in 2010 and 2011 estimated that imports accounted for 55% of all foods consumed locally (MOPIC, 2011: 16). This study estimates that imports accounted for about 65% of available food by volume (tonnage), and about 82% of available calories in 2020.[1] Cereal imports accounted for about 89% of total cereal availability in the same year (Customs data; MAI, 2019). This extreme and increasing import dependence has made Yemen's food systems vulnerable to changes in international prices for basic foods and fuel, and to foreign exchange shortages.

This paper looks at how Yemen has arrived at such an extreme situation of dependence on imported food, and the way in which the structure of the private sector in Yemen has both shaped, and been shaped by, this dependence. It assesses whether the private sector is able to meet Yemen's food needs, and analyses the challenges faced by private sector food importers, wholesalers and retailers. It concludes by looking at possible UN strategies to support Yemen's import-dependent food systems.

The paper is based on a review of scholarly and policy literature relating to imported food and the private sector in Yemen. It draws heavily on foreign trade statistics from customs data, international databases and Yemen's Foreign Trade Statistical Bulletins series, which was discontinued before the conflict began: these sources are inconsistent, but give some helpful indications of overall trends. The paper also draws on 40 phone interviews and re-interviews with key informants, and a survey of 50 food traders and nine chambers of commerce in eight governorates, plus the capital Sana'a, representing most of Yemen's ecological zones and militiadoms and polities.

Historical development of food imports

Sixty years ago, Yemen imported little food. Since then, it has undergone a succession of major social transformations, each of which has increased its dependence on food imports. This section

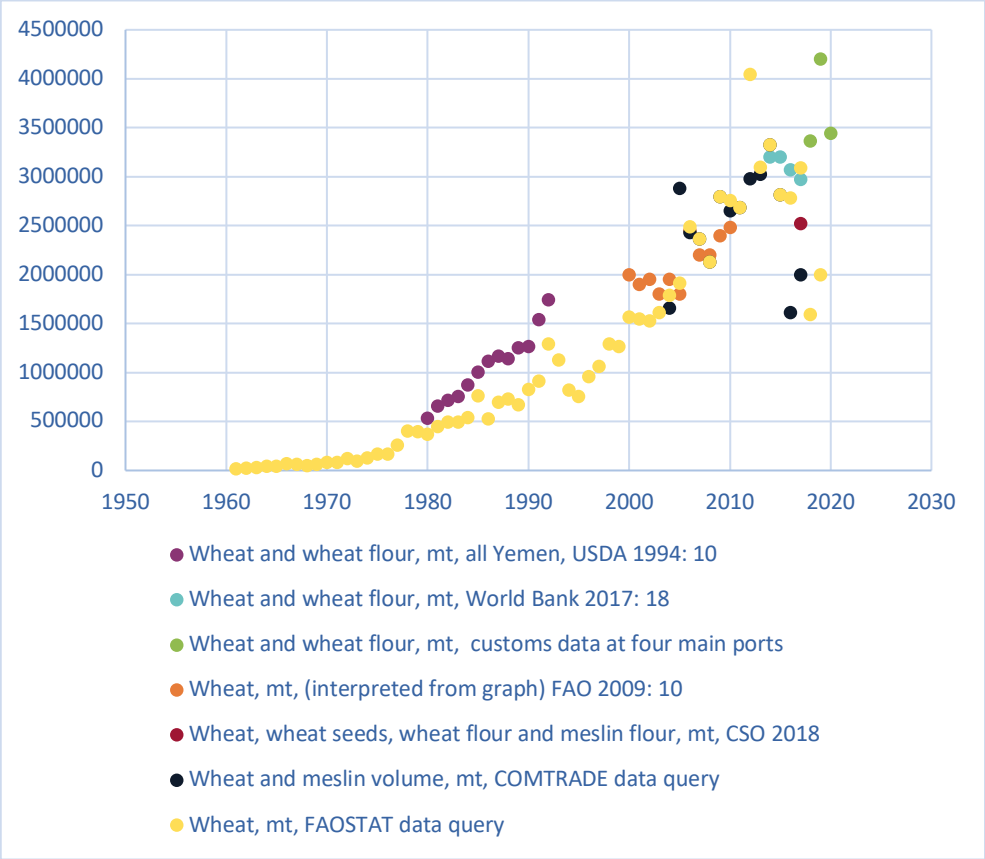
[1] Imports provide more calories relative to weight because fruit and vegetables make up more than half of the weight of domestic production. These two food groups are relatively high in water content, and relatively low in calories.

traces these transitions through a history of wheat and wheat flour imports. Wheat has been selected because it dominates imports and food systems. The wheat import market is also the most concentrated of all food markets in Yemen. Between 2014 and 2016, two companies accounted for about 78% of wheat imports, and eight importers accounted for nearly all of the rest (World Bank, 2017: 19). The conflict may have increased that concentration, according to some interviewees.

The data sources identified in Figure 1 quantify wheat imports for the whole of Yemen, before and after unification. For most of the past 60 years, these sources show a rapid and consistent increase in wheat imports, although they diverge significantly after the start of the conflict. From then on, figures from the UN International Trade Statistics Database (COMTRADE) and the UN Food and Agriculture Organization (FAO) – both drawn from an analysis of global trade statistics – decline sharply. However, customs data from Yemen's four main ports, shown in yellow, suggests that the rise in wheat imports has continued during the conflict.[2] Customs data from the four ports for the period from October 2020 to September 2021 (not shown on the graph) indicates that over 4 million metric tons (henceforward tons) of wheat and wheat flour were imported. This study assumes that customs data is more accurate than international trade databases – indeed, if the lowest figures from the international databases were true, Yemen would have only enough calories for half its population.

[2] The ports are Salif, al-Hudaydah, Aden and Mukalla.

Figure 1 Different sources compared: Yemen, wheat imports in metric tons, 1961–2020



The data presented in Figure 1 needs some explanation. Customs data from 2018–2020 includes about 0.9 million tons of bulk food imported by humanitarian agencies, much of which is likely to be wheat. This wheat is milled, stored and distributed by private sector actors – so the process of importing may support importers' profits, even if the financing of imports is external (ACAPS data). If recent customs data gives an accurate picture of wheat imports, this suggests that the conflict constitutes another major transformation entrenching the power of wheat importers. These transformations began 60 years ago.

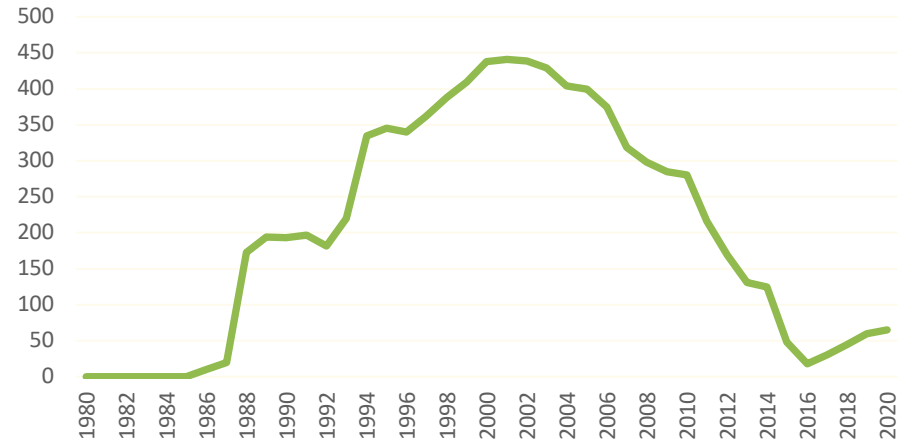
In the 1960s, Yemen was made up of two poor agrarian countries unsettled by drought, civil war and a violent colonial departure (Golovkaya, 1994). It was largely self-sufficient in cereals and other foods, and wheat imports were insignificant. In the 1970s, workers from the countryside began to be drawn towards the oil economies of the Arabian Peninsula, and Saudi Arabia underwrote the government's budget deficit. Remittances and rents helped to fund a booming market for imported goods and led to the emergence of a new class structure of state employees and clients, migrant workers

and import-export traders (Mundy, 1995: 15–16). Wheat imports began to rise.

After 1986, things changed. Oilfields in South Yemen began production, the two countries merged into one, and in 1991 Saudi Arabia expelled its Yemeni workforce. Oil revenues gave the state economic autonomy from the productive efforts of the civilian population, at once facilitating and necessitating the expansion of security budgets and patronage systems benefiting tribal and mercantile clients. State control over circuits of capital pushed import-export traders into alliances with security elites. Agricultural investment was oriented – often at the behest of donors who dominated agricultural policy – towards irrigated crops for export or market consumption. As a result, Yemen's labour-intensive but ecologically sustainable rainfed agricultural systems were left as the preserve of a largely female workforce operating at the margins of the market. Oil revenues financed urbanisation and also financed wheat subsidies (Enders et al., 2002: 21). Licences and tenders for wheat drew importers into client relationships with the state, and allowed a few traders to dominate the wheat trade: one company spokesperson estimated that their company won 70% of tenders in this period (interview).

From the mid-1990s, Yemen began reducing food subsidies and liberalising markets as part of a package of macroeconomic reforms promoted by international financial institutions (Enders et al., 2002). This period saw oil production peak and the consolidation of the power of the security state, whose leading figures invested their considerable rents in the private sector, just as economic policy began to be oriented towards support for 'the private sector' (Hill et al., 2013: 19; interviews). Macroeconomic reforms ended wheat subsidies and liberalised imports, and private companies set up milling and silo storage operations (interview). Liberalisation reorganised the boundaries between public and private interests in a way that favoured the alliance between merchants and the security state. While the end of subsidies brought hunger and unrest, it did not end the momentum behind wheat imports, which almost trebled between 1995 and 2010 (Mundy et al., 2014: 139; Lackner, 2017: 223).

Figure 2 Yemen, crude oil, natural gas plant liquids and other liquids production, 1980–2020, thousand barrels per day



Source: EIA

The global food price shocks after 2007 stressed this system just as oil revenues began a sharp decline (see Figure 2). By 2011, Yemen's complicated patronage system, which networked the mercantile sector and a tribalised rural governance system with the security state, began to fall apart. A long period of unrest culminated in the current conflict, which has put new strains on the private sector: petroleum revenues have all but collapsed, banks no longer have foreign exchange to provide to importers, Yemen is divided into different military and currency zones, greatly increasing the costs of transactions and transportation, access to foreign exchange is politicised, and new traders have used political and military connections to enter the market. But evidence from customs data suggests that wheat imports have increased during Yemen's dire new transformation.

Yemen's private sector, dominated by the import-export trade, is top-heavy but durable. It has survived five decades of dramatic economic transitions, adapting as the economy shifted from agriculture to remittances then to oil and then to war and crisis. Wheat importers lead the largest conglomerates in the country, and at each dizzying transition, their hold over markets seemingly increases. The next section looks at why this is the case.

Imported food and the private sector

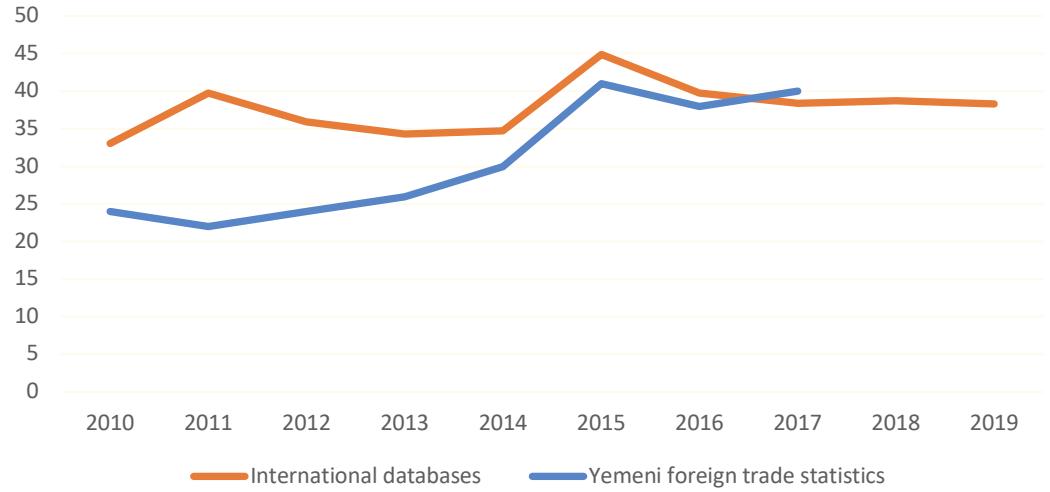
Yemen's private sector is top-heavy, with a small number of companies, many organised into conglomerates, dominating a much larger group of small, informal sector entities. Most private enterprises are very small. The Central Statistical Organization carried out an

'establishment census' in 2004, counting up the number of private sector establishments. This identified 276,719 private sector establishments with under five workers, 16,155 with under 25 workers and 1,034 with over 25 workers (World Bank, 2015: 8). Small and medium enterprises enter and exit the market very rapidly, while the handful of well-connected firms controlling much of Yemen's economy endure. Yemen's conglomerates are mainly focused on the import trade.[3] Apex conglomerates – the handful of big merchant houses which control much of the formal economy – are the major food importers. Companies belonging to these conglomerates import much of Yemen's food, and other companies in the same conglomerate process and distribute bulk food, handle non-food imports, and own banks which once played a key role in financing imports. Food imports are central to the operations and profitability of these apex conglomerates because food is probably now the largest single import into Yemen (see Box 1).

Box 1 Shifting patterns of food imports

Food imports make up about two-fifths of total imports in Yemen, and data indicates that the share of food imports in total imports has stayed high or even increased since the start of the conflict (data from international databases and Yemeni official publications is inconsistent). This suggests that food import dependence suits the interests of the import conglomerates and that shifting to imports that support domestic production may be a challenge (OEC data query, CSO).

Figure 3 Food imports as a percentage of total imports by value (US$), 2010–2019



[3] Many conglomerates control manufacturing companies, most of them adding value to bulk imports. Private sector manufacturing contributed about 4% of gross domestic product (GDP) in the decade before the conflict – whereas trade and commercial services accounted for almost 40% (CSO, 2018).

Source: OEC

In 2020, customs data indicated that about two-thirds of total food imports were cereals: an estimated 4.4 million tons (of which 3.4 million tons were wheat). Conflict and declining purchasing power have shifted consumption patterns, pushing many Yemenis to substitute more expensive and nutritious foods for cheaper, lower-quaity ones (see Tandon and Vishwanath, 2021; interviews with food traders).

In 2020, private companies are estimated to have imported 5.2 million tons of food. An additional 0.9 million tons was imported by humanitarian agencies, bringing the total to 6.1 million tons. Conglomerates play a vital role in handling humanitarian food imports because their control of milling, storage and distribution companies means that humanitarian actors have to use their services.

Yemen's extreme dependence on food imports has empowered food importers and the import-oriented merchant houses of which many are a part. These companies and houses dominate the private sector, although it is difficult to quantify the extent of this dominance. One widely cited pre-conflict study estimated that, in 2011, 10 families and business groups connected to then-president Ali Abdallah Saleh controlled more than 80% of imports, manufacturing, processing, telecommunications, banking and transport (Hill et al., 2013: 19). One former bank official estimated that there were 220 companies with corporate accounts in Yemen (some of these companies are part of a bigger conglomerate).

one account). Another way of understanding this concentration of merchant power is to reflect on the processes involved in bulk food imports. Participation in the bulk cereal market requires financial depth as well as storage, milling and distribution infrastructure. The two main conglomerates which own these infrastructures are able to dominate the market and deter entrants.

Food availability and food security

This study estimates total food availability by putting together 2020 customs data from four ports and two land crossings, and 2019 domestic production data from the agriculture ministry, on the (imprecise) assumption that the 2019 harvest and 2020 imports constituted available food in 2020. Imports made up about 65% of food supply by gross weight. The contribution of imports to total available calories is even more important. Imports provide more calories relative to weight because fruit and vegetables – food groups that are relatively high in water content, and relatively low in calories – make up more than half of the weight of domestic production.

Taking into account the higher calorific value of imports, this report estimates that imports provided 84% of available calories in 2020.

This section roughly reckons the calorific value of available domestic and imported food in 2020, and concludes that Yemen does not have enough available food to provide food security for its people.

Food insecurity is not a new phenomenon in Yemen; it affected one-fifth of households in 2002, at the peak of the oil boom (Kabbani and Wehelie, 2004). Food security studies of the last two decades indicate that Yemen's food import system can survive or even grow without delivering food security (see Box 2). The structure of Yemen's import-dependent food system, organised by the private sector, may have played a role in perpetuating this insecurity, even though the acute nature of the current crisis is driven by the conflict. These issues are discussed in a linked paper (Thomas, 2022).

Box 2 Food availability and food security

During the 1970s, when food imports began in earnest, FAO estimated that average kilocalories per person per day rose from 1,993 to 2,475. But child nutrition studies in the 1970s and 1980s found that nearly all pre-school children were malnourished (El Daher, 1990: 532–533; Bagenholm, Kristiansson and Nasher, 1988). The first national food security survey, conducted in 2002 at the height of the oil boom, found that 42% of households were food insecure or vulnerable to food insecurity (Kabbani and Wehelie, 2004: 9). A 2009 national survey found that 31.5% of the population were food insecure (WFP, 2010: 34).

These studies used different methodologies and trends cannot readily be extrapolated from them. However, they suggest that, although food importers have transformed food systems and the private sector, these food systems have never been able to meet the needs of the Yemeni population. In 2021, the consortium of food security organisations which produce the Integrated Food Security Phase Classification (IPC) estimated that only 5.2 million people – 17.3% of the population – were food secure. The rest were hungry: over half faced crisis or emergency levels of food insecurity.

This report estimates that Yemen did not have enough available food to feed its population in 2020. Before the conflict, food security surveys estimated that the daily calorific consumption of the average Yemeni stood at 2,301 kilocalories – just above the recommended minimum (Ecker et al., 2010: 16). But the rough reckoning of food availability, based on aggregating 2020 customs data with 2019 domestic production data, strongly suggests that available food is not enough to meet basic needs.

Wheat is the cheapest and by far the most available source of calories: customs data from 2018–2020 suggests that cereals made

up over 80% of total food imports by volume – and wheat made up about 68% of total food imports by volume, almost 40% of total available food in the country.[4] It seems likely that consumers are switching to drearier diets, dominated by wheat.

Box 3 Computing average daily calorific consumption using 2019 production data and 2020 customs data

In 2020, a total of 9.4 million tons of food was available in the country. About 6.1 million tons was imported – mostly bulk wheat, rice, corn and sugar. In addition, 3.3 million tons of food was domestically produced – mostly fruit and vegetables, animal proteins and legumes. If all that food were divided up between each Yemeni, that would give them 870 grams of food a day, half of it cereals, with a calorific value of about 2,400. However, this is much more than people get: the 9.4 million ton total is the weight of food before processing, seed offtake, spoilage and distribution losses, which significantly reduce the weight of food available. For example, unprocessed cereals probably made up about one-third of all available food – nearly all of that imported bulk wheat. One metric ton of wheat makes about 850 kilograms of brown flour or 720 kilograms of white flour (Yemenis prefer white flour, and wheat bran was one of only two exports (the other is molasses, a by-product of sugar refining) listed in customs data over the past few years). Such an average also does not take into account inequitable distribution of food. A pre-conflict study estimated that the poorest groups depend on cereals, sugar and cooking oil for most of their calories, with vegetables a few days a week (WFP, 2010: 31). If these poor foods were divided up among the population, each person would have about 420 grams of unprocessed cereals, 7 grams of unprocessed sugar, a gram of oil and 31 grams of fresh vegetables a day – between 1,800 and 2,000 kilocalories. Processing, spoilage, seed offtake and distribution losses significantly reduce this low per capita calorific average.

A supply problem or a demand problem?

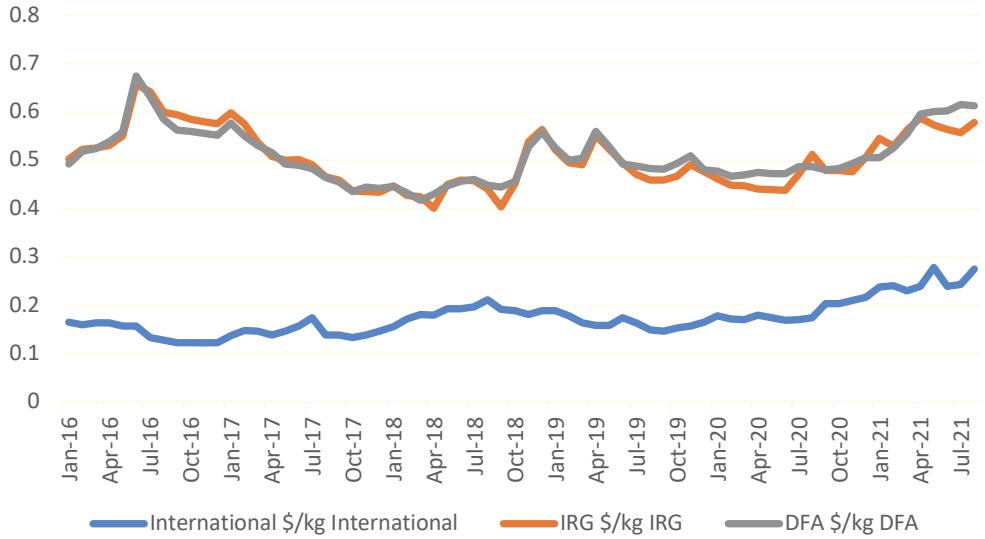
Is Yemen's food security crisis the result of a problem of supply or demand – or both? Should policy-makers focus on building purchasing power, or should they support suppliers to maintain supplies?

Price data suggests that supply is not the main problem. Figure 4 indicates that domestic prices in each of Yemen's two currency zones track international prices closely – although transaction costs

[4] Only 90% of customs records relating to food imports disaggregates imports into food groups.

mean that retail prices are generally over twice the international price. If supply was a problem, that would be reflected in greater domestic price volatility.

Figure 4 Wheat prices in Yemen's two currency zones (US$)



Source: ODI

The coexistence of diminished overall food availability and increased overall grain availability also suggests that supply is not the nub of the problem. The apex conglomerates have been able to increase imports of the cheapest foods, for which effective demand is rising. Because the grain market is so narrowly concentrated, the apex conglomerates capture more and more of the market. It is likely that these conglomerates will be able to supply the country with wheat in the short and medium term – the main constraint on food availability is demand.

But that is not to say that there are no supply problems. First, domestic production has declined sharply in volume and value (Thomas, 2022). Second, the ever-expanding wheat market, and the ever-narrowing control over it, leaves the country vulnerable to a host of external shocks and prevents the emergence of alternative food systems. Third, the conglomerates play a central role in the food system, but they are not its only protagonists. The food system depends on thousands of wholesalers and retailers who are much more exposed to shocks than the big conglomerates.

Policy-makers thus need to pay attention to supply questions. But they also need to pay attention to demand. The decline in domestic food production has undermined the purchasing power of agriculture-dependent households. It is one of several factors depressing purchasing power at household level. Economic contraction, non-payment of salaries, depreciation of the currency and conflict costs have all reduced people's ability to buy food, and importers will not import goods they cannot sell: the availability problem is linked to the

affordability problem. The challenge for policy-makers is to find ways to stimulate demand – including by helping apex conglomerates to transition to demand-stimulating business models.

Policy-makers need to support Yemen's food import system in the immediate future – it is vital that the private sector continues to supply food in the absence of a viable alternative. But policy-makers should also study carefully its limitations, and tailor support around the risks faced by private sector actors, and the risks of food insecurity.

Economic, financial and political challenges for food importers and food security

This section looks in detail at the economic, financial and political risks faced by food importers, and their potential implications for food security. It draws on a survey of 50 food traders and nine chambers of commerce in eight governorates, plus the capital Sana'a, representing most of Yemen's ecological zones and militiadoms and polities. The survey was conducted in late 2021, and was based on a convenience sample.

1.1.1 Purchasing power

Low purchasing power means low demand for food: Yemen's food availability problem has happened because private sector importers restrict supply in response to demand. The purchasing power of many Yemenis has collapsed as a result of non-payment of public sector salaries, a massive contraction in most productive sectors, a currency crisis which inflates prices, and the structural limitations on purchasing power that affect market-marginal workers (see Box 4). Most food traders and representatives of chambers of commerce interviewed said that purchasing power was decreasing. They said that people bought less food, lower-quality food, or looked for food from non-market sources.

Box 4 Yemen's market-marginal workers

Yemen's market-marginal workers are mostly rural women. Although they do not direct their productive energies towards pay or profit, their households mostly depend on markets for basic food needs. Low purchasing power is thus not just an outcome of non-payment of salaries or economic contraction affecting markets in town. It is part of rural Yemen's traumatic agrarian transition. Rural producers now need to earn money to eat, although a lot of their energy is spent on things that do not bring in money. This is a key element of the 'affordability problem' – the fact that, because people cannot afford food, importers do not undertake the complicated international transactions needed to supply it.

Low purchasing power may paradoxically entrench the dominance of the biggest conglomerates supplying basic foods, as people switch to cheaper foods. However, low purchasing power deeply affects smaller private sector actors supplying more expensive goods such as infant formula (interviews).

1.1.2 Changing relationships between smaller and larger traders

The concentration of commercial power which food importers have marshalled may have helped them weather a particularly daunting crisis and maintain, against the odds, Yemen's inadequate food supplies. The survival of the apex conglomerates that make up the food oligopoly suggests that this oligopoly enjoys autonomy from other traders and productive forces. The conflict appears to be entrenching their power. One economist interviewed said: 'We are not in the way to make a more competitive market, but a more parasitical market, a greedier market'.

The apex conglomerates are surviving, but what are the risks to their distribution networks? A representative of a major food import conglomerate described the distribution system in an interview. A factory owned by one company in the conglomerate produces wheat or milk. Products are supplied to a trading company, part of the same conglomerate, which then supplies it to about 100 distributors, then to thousands of wholesalers, then to retailers. 'Our relationship is with resellers and wholesalers. Credit is given to the wholesalers. Not to retailers. I don't know if wholesalers offer credit to retailers,' said the representative (interview).

The survey of food traders and chambers of commerce asked whether there had been an increase or decrease in the number of wholesale, retail and informal traders selling basic foodstuffs in the governorates under study. Responses varied significantly by governorate. In Abyan, Sana'a and Marib, interviewees reported increases in the number of food traders. The main reason given was rapid population increase and urbanisation – Marib hosts about one-quarter of the country's four million internally displaced people. In Abyan, two interviewees cited the 'obscene' profits gained from participation in the war. In Sana'a, one interviewee said that fruit trader numbers had increased because fruit farmers are no longer able to export production.

Interviewees in areas that had lost populations to displacement painted a different picture. In Hajjah, interviewees reported a decline in the number of food traders because of the impact of conflict. Some traders have abandoned trade altogether, traders do not offer credit and recent tax increases, checkpoint fees and demands for contributions to the state all undermine profits. In al-Hudaydah and Hadhramawt, the picture was mixed: interviewees said that the population of displaced people and the decline in local production

had led to an increase in trader numbers, but lack of capital and the challenges of dealing with foreign currency and inflation may have limited that increase. In Sana'a city, informal food sellers were decreasing in number because of strict supervision of informal traders. In Aden, the number of food wholesalers and retailers was increasing, because traders were moving there from areas under the control of the de facto authorities, and because migrant workers were opening supermarkets and malls. But Aden's informal food sellers were decreasing in number, again because of increased supervision.

Interviewees reporting increases in trader numbers often attributed this to the collapse of salaried work, and the displacement of traders from conflict areas to quieter parts of the country. This suggests that, for some food traders, commerce is a survival strategy – in the absence of productive activities, many people move into informal services. But these informal traders run significant risks. Most have to deal in cash, often computing across different Yemeni and regional currencies. The biggest conglomerates can expend effort on forecasting and financing trade, but small companies face daunting financial challenges. The next sections look at foreign exchange, the dual currency system and access to credit, as they affect smaller and larger traders.

1.1.3 Access to foreign exchange

Private sector food importers need access to foreign exchange to finance food imports. For example, the 3.4 million tons of wheat imported in 2020 would cost over $700 million at 2020 prices. Some of the apex conglomerates are cash buyers, while others have accessed new sources of finance, often with political strings attached. Smaller wholesalers and retailers also need foreign currency to finance trading operations, but their financial options are much narrower.

Before the conflict, the Central Bank provided foreign currency to commercial banks, which then issued letters of credit to importers.[5] Many commercial banks were owned by or linked to big conglomerates, and they shared the risk aversion of the merchants. The macro-economic reforms of the mid-1990s offered them new ways to avoid risk. The Central Bank closed its term deposit facilities for commercial banks and instead began auctioning Treasury bills, seen as a less inflationary way to finance government budgets (Enders et al., 2002: 43). Treasury bills are government-backed short-term debt instruments. In Yemen they were backed by oil revenues and offered lower risk and higher returns and the commercial banks bought up government debt rather than investing in productive sectors of the economy. The market in Treasury bills all but collapsed after 2015, and the commercial banks, which had

[5] A letter of credit is a promise by a bank on behalf of a buyer to pay a seller a specified amount in an agreed currency, usually US dollars.

invested most of their capital there, were no longer able to finance traders (Al Shaibani, 2020: 6).

The close relationship between big conglomerates and commercial banks is one of the weaknesses of Yemen's oligopolistic system. The Central Bank brought in rules to prevent insider lending, pushing conglomerates to borrow from banks linked to rival conglomerates. But when the Central Bank was no longer able to pay out, commercial banks reshuffled liabilities in a way that protected their owners: 'If you're not in the VIP room, they'll tell you the money is with the Central Bank of Yemen, and they won't pay' (interviews). This process may lead to even greater concentration of market power in the future.

With commercial banks unable to offer credit, new financial institutions began to control the foreign exchange which Yemen needs to finance its imports. Microfinance institutions and Islamic banks, established in the mid-1990s, were not exposed to Treasury bills, and money-changers were able to attract foreign exchange in the form of remittances. Tadhamon Islamic Bank ticks all these boxes: it started as a microfinance institution, did not invest in Treasury bills because of religious prohibitions on lending at interest, and provided remittance services to migrant workers in the Gulf. The bank is linked to one of Yemen's apex conglomerates, the Hayel Saeed Anam group (interviews).

Yemen's banking system became even more complicated when the internationally recognised government decided to move the Central Bank to Aden in 2016, resulting in a de facto separation of the Central Bank's functions between Aden and Sana'a. This decision led to the emergence of widely divergent exchange rates as well as unprecedented new rivalries over access to foreign exchange. These rivalries intensified in 2018 when, during a particularly violent phase of the conflict, Saudi Arabia deposited $2 billion with the Central Bank in Aden, intended to fund letters of credit to purchase imports. About half the deposit went to companies that were part of an apex conglomerate, with the rest going to some 80 companies. Only a negligible proportion of the deposit was allocated to companies headquartered in areas under the control of the de facto authorities in Sana'a (interviews). This signified a new level of politicisation of access to foreign exchange. The de facto authorities have their own oversight bodies for managing foreign exchange flows, which are often accused of allocating capital to political supporters. These rival structures for allocating capital to the conglomerates on which the country depends for its basic food supply could potentially shape future crises in food insecurity (interviews).

1.1.4 The dual currency system

Smaller traders face more immediate risks of financial fragmentation. The Aden and Sana'a branches of the Central Bank pursue rivalrous monetary policies, creating a dual currency regime. This complicates

financial management for companies and conglomerates working across both currency zones, and for everyone who depends on them. The de facto authorities in Sana'a control money supply, including the circulation of physical notes, much more strictly than the authorities in Aden, and this has kept currency in the Sana'a Central Bank currency zone more stable than in the Aden Central Bank currency zone. Stricter controls in the north also keep currency in the zone: in Aden, companies aim to buy foreign currency and get it out of the country (interviews).

Banks no longer control capital allocations, so food importers need to access foreign currency from other sources. Apex conglomerates use foreign currency generated from their commercial operations in other countries, and some are able to access foreign exchange by managing remittances. Although the use of political connections to obtain foreign currency has become much more complicated, the conglomerates have risen to that challenge: the Saudi deposit suggests that bigger companies are better placed to negotiate access to foreign currency. The Hayel Saeed Anam conglomerate, the principal beneficiary of that deposit, successfully applied for a credit facility from the International Finance Corporation, part of the World Bank Group, which was used to support the conglomerate's working capital, in order to reduce food shortages and ensure supply chain sustainability (IFC, 2021).

The availability of foreign exchange has diminished greatly over the course of the conflict. Yemen has four main sources of foreign exchange, none of them easy to quantify. First, remittances, the main source of foreign currency in the country: in 2019, these were estimated at between $3.8 billion and $8 billion (ACAPS, 2021). Second, exports: according to international trade databases exports fell from $6.5 billion in 2014 to $0.9 billion in 2016. In 2019, the latest year covered, exports were worth $1.4 billion. Crude petroleum made up two-thirds of their value.

Humanitarian agencies are another important source of foreign currency. In 2019, the most recent year for which figures are available, UN agencies reportedly purchased 355 million dollars' worth of Yemeni rials, two-thirds of which were allocated to areas under the control of the de facto authorities. At the time the Yemen humanitarian response was receiving record levels of funding; the amount of dollars exchanged into rials by the UN has since decreased significantly.

One economist estimates that 80% of Yemen's money supply is controlled by 1,400 largely unregulated money-changers and foreign exchange bureaus. This guesstimate reflects the fact that these enterprises handle significant amounts of remittances. They also handle much of the dual currency system, collecting funds from one currency zone and delivering them to the other. These financial service providers are networked with new security actors, and many

small and medium food traders depend on them to keep up the trade on which Yemen's food security largely depends. A big part of Yemen's current crisis is the near-collapse of commercial banking as a result of a sharp downturn in oil revenues – small unregulated players have far fewer resources to deal with the next financial crisis.

Interviews with food traders conducted for this paper indicated that these foreign exchange bureaus have become vital to Yemen's food system, dealing in currency at official and parallel prices. The big conglomerates use them to manage dual-rial cashflows, and small traders use provincial branches to buy currency, sometimes through after-hours phone auctions at parallel rates (interview). Nearly all smaller traders need foreign currency to purchase food supplies (see Box 5).

Box 5 Smaller traders and currency risks

Twenty-one of 31 food traders who answered questions on currency said that they used foreign currency to purchase food. Two additional traders reported using local as well as foreign currency to purchase food. Only eight traders reported using only local currency to purchase food. These eight traders were in the governorates of al-Hudaydah, Hajjah and Sana'a, under the control of the de facto authorities. Traders in Sana'a city all reported using foreign currency, perhaps because they are in a position to benefit from currency price fluctuations. Traders everywhere align prices with exchange rates.

In each governorate under study, some food traders, including traders from firms self-described as 'medium-sized', reported that they imported some of the food they sold, which might explain their need for foreign currency. But outside the governorates of al-Hudaydah, Hajjah and Sana'a, traders said they needed to finance purchases from wholesalers in foreign currency.

1.1.5 Access to credit for traders

Eighteen out of 31 traders who answered currency questions said that they used only cash to buy their stocks – for most, that means getting foreign currency. The other 13 traders said that they were sometimes able to purchase on credit from wholesalers or banks. Nearly all the traders in Hajjah and al-Hudaydah – where transactions were reportedly in Yemeni rials – said that they obtained credit from wholesalers against a security.

The most common credit transaction involved wholesalers offering commodities to trusted retailers on credit, although two traders said that they obtained loans from banks or exchange bureaus – both self-described as 'big' traders. Borrowers provided security to lenders. Most (but not all) of the traders reporting credit transactions operated in areas under the control of the de facto authorities, and credit was extended in Yemeni rials issued by the Central Bank of Yemen in Sana'a. However, in Sana'a city, traders all bought in cash. One

observer commented that political connections gave relatively easy access to cash in the capital.

Box 6 Credit for customers

Nineteen out of 31 traders in imported food reported that they still offer credit to customers. Customers pay off their debts at the price of the goods on the day of payment. Most traders said that credit for customers was decreasing, but a small number of traders said that credit was increasing. Traders reporting a decrease in credit cited non-payment of salaries as a reason for not extending credit to customers: 'debt assumes a fixed income'. Others cited currency volatility. One of those reporting an increase – a Hadhrami trader who makes his purchases using foreign currency in cash – reported that credit was increasing because of increasing trader numbers.

Other traders attributed the increase in customer credit to the non-payment of salaries – a riposte to the traders who believe that credit cannot be advanced to unreliable debtors. This suggests that debt relationships may overlap with social obligations in the urban areas where the study was undertaken. Some interviewees stressed the importance of solidarity or patronage networks in reducing declines in food insecurity and managing food price inflation. One interviewee reported that some traders in Sana'a regularly donate food to particular families in distress. When traders were asked to describe factors characterising successful companies, several mentioned the ability to give credit – and when asked to characterise unsuccessful companies, inability to give credit was cited. One interviewee explained the importance of urban networks:

Which businesses are most exposed to the crisis? Small shops in every street in Yemen. One family grocery. These people give yoghurt and milk products from Hayel Saeed to their neighbours, and the neighbours don't have salary. If there's a government salary payment, they can pay Hayel Saeed. [If not] Hayel Saeed will say: you need to pay. The small business says: I didn't collect my money from the people in the neighbourhood. Now you have to close. So now Hayel Saeed only sells on cash basis, and these small businesses don't have enough demand to survive. These small businesses are very vulnerable (interview).

1.1.6 Barriers to entry

Traders were asked to characterise successful and unsuccessful traders. As indicated in Box 6, giving customer credit was one success indicator. In responding to this question, most traders named the major conglomerates and big companies: Hayel Saeed Anam was the most frequently mentioned. Commercial companies with an established customer base, a wide network of branches, a wide range of stock, at competitive prices, and with the kind of financial

resources which allowed them to maintain good relations with authorities were also considered successful. The main success factors identified by interviewees were access to finance, access to fuel, transport and logistics infrastructure, and social networks. Traders interviewed characterised less successful companies as those which were most exposed to increased costs of foreign currency, which were not able to offer credit, and with low stock and little stock variety.

Traders interviewed discussed some of the ways that companies hedge against failure: hiring their own trucks, keeping fuel reserves, bulk buying, and moving storage facilities nearer to shops. Most of these require access to foreign currency. Many traders appear to have started trading recently because of a lack of alternative income sources, and new entrants may find business administration very challenging.

Yemen's top-heavy food import system does not encourage competition. But there are plenty of new entrants to the food trade, including small and unregistered traders. Although the substantial infrastructure needed to import wheat presents daunting barriers to entrants, markets for rice and sugar allow smaller operators space. New entrants have different profiles. Some import containerloads of packaged basic foods, which are easier to distribute. Others use political connections or logistical capacity to win supply contracts for aid agencies or military camps. In Hadhramawt, militia salaries are reportedly leading to investment in trade (interviews).

Paradoxically, these new entrants may benefit the big conglomerates. Past political, military and tribal beneficiaries of economic transitions partnered with established commercial companies to make profits. Some evidence suggests that this pattern has continued: new, politically connected fuel and currency traders reportedly invest in the old, durable private sector. This may mean that new entrants may not destabilise the system, at least in the short term (interviews).

An overview of risks

The conflict presents different challenges to different types of traders. Smaller traders are probably most affected by the decline in purchasing power. Most can no longer offer credit to customers who cannot pay for food, and most cannot get credit themselves. This puts enormous pressure on their capacity to manage stock and cashflow and to monitor prices that are actually or effectively set in foreign currency. Their profits are at risk if they cannot manage all these challenges: in al-Hudaydah, several traders reported that they had heard of other traders who were abandoning commerce.

The challenges faced by apex conglomerates are different. They need to maintain access to foreign currency, even as control of much of the country's foreign exchange slips into the hands of informal money dealers. They need to maintain profits as purchasing power declines. And they need to ensure that their distribution networks do not collapse.

Current trends suggest that the conglomerates have the capacity to manage the major risks they face, and that conflict may have entrenched their dominance. First, they are positioned to benefit from the momentum towards wheat dependence, which is suggested by historical import data, because conflict immiseration is pushing Yemenis towards the cheapest, bulk import foods like wheat (interviews). Some of these conglomerates won their first concessions from the state in the Mutawakkalite kingdom (1918–1962), and they have managed to win concessions from every regime since. They appear to have the financial depth and strategic savvy to survive the current crisis.

Second, they maintain the capacity to work across frontlines, improvising strategies to deal with the dual currency system. However, conglomerates have been pushed into choosing alignment with one or other rival authority. For example, the two largest conglomerates working in areas under the control of the de facto authorities, linked to the al-Habbari and Fahem families, have difficulties accessing finance from the Central Bank in Aden. The Fahem group is investing significant sums in Saleef port – perhaps anticipating future barriers to food imports from Aden into the north. Several interviewees reported that politically connected fuel- and money-men seek to invest war profits in these established mercantile houses. The ability of the mercantile private sector to incorporate new elites and access new circuits of capital is linked to its scale and reach, and over the course of the conflict, its position has become impregnable. 'If these businesses stop their operations, Yemen will suffer a major famine,' said a representative of a major food company (interview).

However, Yemen's big oligopolies are not impregnable, and could face a dramatic reversal if new entrants to the market, allied to security interests, try to seize part of this enormous market – or if the apex conglomerates, which are allying with one or the other side, make a serious political misjudgement.

One of the largest risks the big conglomerates face is that they may not be able to generate new business models which stimulate demand, allowing them to exchange their captive market for something more profitable. They have little incentive to invest in risky productive activities as long as trading profits are so steady. But the trading system that they run has not and probably cannot deliver food security to the population. Intervention from the state, with the support of the international community, is needed.

Conclusion

Yemen's private sector, dominated by importers and traders led by a few apex conglomerates, has risen to the unprecedented challenges of the civil war: two state systems and smaller militiadoms with a proliferation of militarised borders; the new checkpoint economy; new, extractive taxation systems; aerial bombardment and militarily imposed import restrictions; the de facto separation of the Central Bank and divergent values of the Yemeni rial; the collapse of the formal import financing system and the proliferation of foreign-exchange shops; the crash privatisation of parts of the electricity and fuel sectors; and deep economic contraction and a collapse in purchasing power. Apex conglomerates have sometimes been pushed to choose between Yemen's internationally recognised government and the authorities in Sana'a. But their control over the food economy has largely protected them from major shocks.

The conglomerates play an essential role in food security and it is vital that their position is maintained in the short and medium term. Support should be aimed not so much at individual firms, but at ways in which distortions in the operating environment can be minimised, business costs reduced, and competition increased.

Stabilisation of the macro-economic situation is a key objective for the short and medium term. Interventions are needed which support greater availability of foreign exchange, foster the integration of Yemen's dual central banking system, and reduce transport costs and the burdens of the dual taxation system. In addition, policy-makers should address the health and food security costs associated with diminished dietary diversity – in response to the current crisis, importers are concentrating on the cheapest bulk foods.

Food imports require a nationwide distribution system, made up of transport, wholesale and retail companies and their financial backers. The survival of this distribution system is just as vital as that of the apex conglomerates – and the financial and logistical pressures faced by smaller actors are just as severe as those faced by larger actors. Policy-makers should consider ways of supporting credit and logistics for these smaller actors.

These short- and long-term strategies need to be backed with new approaches to research. A better understanding of the capacity of and challenges faced by local traders is needed, in particular how they access the credit and foreign exchange needed to continue

commercial operations. Risks to local traders and credit systems should be assessed alongside the risks faced by bigger actors.

In the long term, Yemeni people need to build up their purchasing power and develop domestic food production in order to ensure food security. Support to the private sector needs to ensure that the long-term aim of food security remains the priority. It is possible to envisage a strategy which integrates support to domestic production, rural livelihoods and purchasing power. Some ideas for such a strategy are set out in a companion working paper on domestic production (Thomas, 2022).

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Appendix 1 Yemen calorie calculations

Estimating food availability in Yemen

This report roughly reckons the food availability in Yemen in 2020 by aggregating 2019 domestic production data with 2020 import data. Crop, meat, dairy and poultry production data comes from the Ministry of Agriculture and Irrigation (2020) 'Annual Agricultural Statistics Book for 2019'. Fish production data comes from UNDP (2020) 'Fishery Value Chain: A Market Study with Potential COVID-19 Impact Analysis'. Import data comes from unpublished customs monitoring. Non-food agricultural commodities such as fodder, tobacco or *qat* were excluded.

Production data, gathered in the thick of conflict, is detailed but only partially reliable: it includes cropped area and production tonnage, specifying crop or animal product and governorate of production. It presumably includes all domestically produced food, whether supplied to markets or consumed at home. This report assumes that 2019 production data roughly corresponds to available domestically produced food in 2020. Import restrictions enforced militarily mean that it is likely that domestically produced food was mostly consumed domestically. Some locally produced food may have been exported, but no food exports show up in customs data, apart from molasses and wheat bran, by-products of sugar refineries and wheat mills processing food imports.

Import data comes from Yemen's four main ports (Aden, al-Hudaydah, Saleef and Mukalla) and two main land crossings (Wadiya and Shahen). Some food imports may come in by dhow at the port of Nishtun, but they are not included in this rough reckoning. Nearly all food is imported in bulk through Aden, al-Hudaydah and Saleef, the three biggest of these ports. This food is handled by major conglomerates with the capacity to land and process millions of tons of unprocessed food. Customs data disaggregates bulk food into specified commodities, like wheat grains or soya bean meal. But some imported food comes in containers, or is not otherwise disaggregated into commodity groups. This imported food amounts to 17% (by volume) of all recorded 2020 food imports, or about 11% (by volume) of all estimated available food. This may reflect the rise of 'container traders' – new entrants to the food import trade who buy in containers of packaged food for sale.

The food accounted for in production and bulk import data is unprocessed, but available data does not indicate whether the food in containers is processed or not. In Yemen, processing is likely to reduce food availability significantly. Yemen grew about 0.1 million metric tons of wheat in 2019 and imported about 3 million more in 2020. One metric ton of wheat makes about 850 kilograms of brown flour or 720 kilograms of white flour (Yemenis prefer white flour). Some of the milling by-products were re-exported (to feed Egyptian cows, according to one informed source) and some may have stayed in country. Yemen produced about 100,000 tons of oranges in 2019 – about one-third of that was orange peel. Some of that peel may have been used to feed animals. Working out how much unprocessed food gets turned into processed food – available food – is an inexact science.

Total aggregated food does not include these processing losses. Nor does it include losses due to spoilage or transportation. But these losses also affect total food availability.

To come up with an approximate figure, this report used the tonnage of all specified imported food commodities – about 83% (by volume) of total imports – and then calculated the amount of calories they would supply ***if they were processed***. It then assigned a calorific value to the remaining unspecified imports, using the average calorific value of the 83% of specified imported food. Then the report used the tonnage of all domestically produced food to calculate the amount of calories they would supply ***if they were processed***. Finally, the report divided 'gross calories' – the calories available if all unprocessed food were processed – by the UN's 2020 population estimate for Yemen and by the 365 days of the year to arrive at an estimate of the daily per capita availability of gross calories. Processing and other losses probably account for at least 20% of the total estimate.

If all the unprocessed food available in Yemen in 2020 was processed, it would provide about 2,400 kilocalories per person per day. Taking into account losses to processing, transportation and spoilage, that would mean that people in Yemen have an average of 2,000 kilocalories of available food per person per day.

These are cautious estimates, and they do not take into account the highly inequitable distribution of food in Yemen. In order to work out the food available to a poor person in Yemen, the report assumes that poor people are likely to subsist on cereals, tomatoes, onions, oil and sugar – in line with the World Food Programme's food consumption analysis (WFP, 2010: 31). There is about 426 grams of unprocessed cereals, 32 grammes of unprocessed tomatoes and onions, 8 grammes of processed oil and 76 grammes of mostly unprocessed sugar available to each person in Yemen each day. If all that food were processed, it would amount to about 1,860

kilocalories per person per day – a little more if the total is adjusted for unspecified food commodities arriving in containers. A cautious estimate of the calorific value of food available to people in Yemen consuming the diet of an average poor person would be under 1,500 kilocalories per person per day.

In conclusion: a cautious estimate of the amount of food available to people eating poor diets in Yemen amounts to about 1,500 kilocalories per person per day. A cautious estimate of the total amount of food available to people eating all diets in Yemen amounts to about 2,000 kilocalories per person per day. Both figures are significantly below minimum daily calorific requirements.

Table A.1 Specified and unspecified food commodities imported through Yemen's four main ports, January–December 2020

Food commodities	Metric tons	Kilocalories per processed metric ton
Wheat	2,972,279	3,550,000
Flour	472,873	3,550,000
Corn	600,217	3,550,000
Rice	131,985	3,500,000
Sugar	356,251	3,870,000
Raw Sugar	476,878	3,000,000
Lentils, peas, beans	16,068	3,300,000
Palm and vegetable oil	96,921	8,840,000
Total specified food commodities imported through four main ports and two land crossings, January–December 2020	5,123,472	
Total unspecified food commodities imported through four main ports and two land crossings, January–December 2020	1,043,164	3,619,057 (average of all imported food)
Total food imports	6,166,636	

Source: Customs data

Table A.2 Food commodities produced in Yemen

Food commodities	Metric tons	Kilocalories per processed metric ton
Cereals	456,714	3,550,000
Mango	362,365	600000
Dates	64,375	2,500,000
Grape	134,187	600,000

Banana	116,300	890,000
Orange	119,084	500,000
Almond	11,340	5,700,000
Peach	11,734	400,000
Pomegranate	27,567	680,000
Lemons	25,668	290,000
Apples	21,946	500,000
Papaya	24502	400,000
Mandarin	20,280	500,000
Other	14,326	400,000
Sesame	21,639	5,700,000
Groundnut	1,551	5,700,000
Potato	233,051	725000
Onion	222,545	420,000
Watermelon	141,283	300,000
Tomato	122,673	180,000
Okra	22,814	310,000
Sweetmelon	37,399	350,000
Capsicum	15,373	200,000
Carrot	15,112	400,000
Squash	10,431	180,000
Other (mostly green leaves)	67,989	300,000
Legumes	93,139	3,300,000
Sheep meat	57,939	2,200,000
Goat meat	73,275	1,200,000
Cow meat	75,602	2,200,000
Camel meat	2,941	1,500,000
Sheep milk	59,125	1,000,000
Goat milk	73,135	45,0000
Cow milk	234,505	60,0000
Camel milk	2,910	450,000
White meat	187,463	1,600,000
Eggs	82,800	1,083,333
Fish	50,000	840,000
Total 2019 domestic food production	3,315,082	
Total food availability (domestic plus imported food)	9,481,718	

UN population estimate for Yemen in 2020	29,825,964
Calorific value of total available food in Yemen, if it were all processed	2,439

Source: MAI, 2019; UNDP, 2020