Introduction

With Iraqi forces planning to retake Mosul and the remaining strongholds in Iraq of the Islamic State of Iraq and Syria (ISIS) in the coming months, UN agencies and their partners have mobilized to address what has been expected to be the largest and most complex humanitarian crisis in the world. Given the scale of destruction and displacement, the need to provide urgent, life-saving assistance has overshadowed eventual reconstruction efforts. Post-conflict development efforts will be critical, however, as they offer an opportunity to restore livelihoods and prevent a return to radicalization.

Restoring agriculture should be a central component of reconstruction efforts. While the oil industry dominates Iraq’s economy, agriculture may have recently employed up to one third of the population and has the potential to drive future growth. Agriculture-driven growth also has the potential to improve food security, increase self-sufficiency, and benefit poor populations in both rural and urban areas disproportionately.

The conflict has left the sector in disarray, and understanding and measuring the scale of the damage in order to rebuild is a complex task. This owes in part to the fact that agriculture and the conflict in Iraq have been inextricably intertwined, with agriculture often being used as a weapon of war. Throughout its occupation, ISIS has looted harvests and agricultural equipment, sabotaged storage facilities, and poisoned land as a form of collective punishment. In the most extreme cases, agriculture itself has been militarized as irrigation pipes have been appropriated to make Improvised Explosive Devices (IEDs), and agrochemicals and fertilizers have been used to make weapons and bombs. Less dramatically, ISIS has sought to distort agricultural markets by controlling and reallocating resources. Finally,
agriculture has also helped fuel the conflict, with ISIS encouraging production in some areas to generate revenue, even as it has neglected or sought to destroy it in others.

Assessing damage and needs is even more complex given pre-existing challenges. Iraq’s agricultural sector has suffered from years of previous conflict and sanctions, and it has often been neglected in Iraq’s overall economic growth strategy. While ambitious plans to increase the sector’s productivity had already been outlined or initiated at the time the conflict with ISIS began, they were stymied by fighting. Efforts to rebuild will have to simultaneously address recent damage and account for long-term neglect. In other words, given the challenges that existed before the conflict, efforts to simply restore the sector to its previous state will ultimately backfire in the long term as they will fail to address urgently needed reforms. Thus, on understanding recent damage and losses as well as pre-existing challenges ultimately offers an opportunity to avoid the mistakes of the past and build back better.

To date, it has not been possible to fully assess and measure the impact of the conflict on production and damage and losses caused by fighting as there is only limited data. In the meantime, the available secondary data and anecdotal information that is available provide the only indication of the effects of the conflict on agriculture and food production. A review of the limited data that does exist is informative, however, as it is indicative of the scale and nature of the challenges that lie ahead. Accordingly, this brief has several goals:

- To analyze the role that agricultural sector has played in Iraq’s economy
- To understand the capacity of the agricultural sector, including key trends and challenges that existed before the most recent conflict
- To summarize the types of damage that have taken place as a result of the conflict with ISIS
- To provide preliminary recommendations on how to measure and address damage and losses following the conflict

With these goals in mind, this brief aims to provide a summary of the challenges that lie ahead as well as a preliminary examination of the role that agriculture could play in Iraq’s reconstruction efforts.
The Role of the Agricultural Sector in Iraq’s Economy

- Contribution of agriculture to GDP had been declining rapidly in the years before the start of the conflict.
- Policies aimed at supporting agriculture have often led to inefficiencies and decreased production.
- There is a great potential in agriculture to support the most vulnerable populations and the overall economy.

Iraq has a number of comparative advantages that would support a competitive agricultural sector, but due to decades of conflict as well as subsequent political and economic events, the capacity of country’s agricultural sector is low. Over the past decade, the sector has continued to decline, compounding the effects of a period of stagnation in the 1990s. As the sector stagnated, small farmers left the countryside and went to urban areas. The most recent estimates available indicate that the rural population comprises nearly one-third (31%) of Iraq’s overall total, suggesting that there are ample opportunities to support livelihoods as well as a need to do so. Pre-conflict estimates also indicate that up to one third of Iraq’s population works in the agriculture sector, a figure that corresponds to approximately 11 million out of 35 million Iraqis.

In terms of contributions to GDP, Iraq’s agricultural sector (10% at most) is relatively small. Oil revenues comprise (38%), and an even larger proportion (61%) of the economy when the oil-funded public sector is taken into account. The oil industry provides few jobs, however, and despite the fact that agriculture makes up as much as one third of employment, Iraq’s oil wealth has allowed it to become dependent upon imported food, which has discouraged domestic production and supplied the market with artificially-priced commodities. (FAO has estimated that the contributions of the agricultural sector to Iraq’s economy may be even smaller and that they have been decreasing over time – 9% in 2002 and declining to 3.6% in 2009.)

Although the government has been heavily involved in supporting agriculture, the nature of this support has been limited in its ability to transform and modernize the sector. Spending, which is often allocated to subsidies and price supports, has led to market distortions and made the sector less competitive. For example, the government has traditionally bought wheat and barley for up to three times their normal market price. At the same time, the government pays farmers more than twice the price that it would pay for wheat imports, in spite of the lower quality of domestic wheat.
There is good reason to believe that the agricultural sector could be a driver of economic growth in post-conflict Iraq in ways that favor the poorest populations most. Both rural and urban households benefit from increased production and lower prices, particularly vulnerable populations, such as female-headed households, which tend to spend a higher proportion of their incomes on food. Poor households dependent upon low-skill labor benefit from increased demand for workers, and increased wages. Growth may still benefit urban, wealthier households, but the effects are lower due to the income and expenditure effects described above17.

Policymakers have been aware of the need to reform agriculture for years. Under Iraq’s National Development Plan (NDP), growth in the agricultural sector aimed to lift growth in other areas such as the food processing and service sectors. Achieving high yields for cereals – especially wheat – as well as for fruits and vegetables would have the largest effects on economic growth and household incomes29. Other recommendations to improve competitiveness before the conflict included improvements in technology, extension services, and infrastructure as well as reforms that would address land tenure issues and bolster value chains28. Finally, diversification and better land allocation were also needed. Iraq has a comparative advantage for some agricultural products, particularly ones that require fertile, irrigated land, such as orchard fruits, vegetables, cotton, sorghum and livestock. However, grains have been emphasized in both rain-fed and irrigated zones in spite of the fact that it is most efficient to emphasize grain production in rain-fed areas30.
Agricultural Production - Trends and Challenges

- Iraq has depended largely on food imports.
- Wheat and barley are the most strategic crops for the country.
- A long-term shortfall in wheat production has been projected.
- Large parts of wheat production areas (40%) have been controlled by IS with many long-term negative effects on production.

Iraq's agricultural production is almost solely for the domestic market, and imports far exceed exports. With the exception of dates, agricultural exports are minimal and have been of comparatively little value in contrast with imports. In 2011 (the year with the most recent, comparative figures from FAOSTAT across a large number of food items), Iraq imported 4.6 billion USD in food and agricultural products while exporting only 55 million USD worth of agricultural products.

In terms of value, the main food commodities imported included wheat (1.1 billion USD), chicken (692 million USD), sugar (584 million USD), wheat flour (447 million USD), and eggs (293 million USD). By contrast, Iraq exported 48.6 million USD worth of dates, accounting for over 80% of its total agricultural exports.

Besides wheat, Iraq also imports many of the main agricultural commodities that it also produces. For example, Iraq produced 1.1 million tons of tomatoes in 2011 but imported nearly 110,000 metric tons; it produced 116,000 tons of chicken meat but also imported 372,000 tons; egg production totaled 42,000 metric tons, but 188,000 tons also had to be imported. With the exception of chicken, Iraq has been more self-sufficient in livestock than in crop production. In 2011, Iraq produced 233,000 tons of milk as well as nearly 50,000 tons of beef and 44,000 tons of mutton; these commodities were not among the main products that Iraq imported, suggesting that domestic supplies are sufficient to meet demand. Production figures for a variety of vegetables, such as okra, peppers, eggplants, etc., were also similarly high.
Wheat is one of the most strategic crops and markets have been heavily regulated and subsidized; it is also the commodity that is tracked most closely by the government, and thus provides some indication of how agriculture is performing in the country as a whole. (Despite this, the Ministry of Agriculture has not had precise statistics on national wheat and barley production since 2014 due to the conflict). Wheat and barley account for almost half the land cultivated (31.4% and 15.7%, respectively). Data collected before the start of the crisis shows that the sector was making some strides 2014. In 2013, total production of cereals was up 257% over five years previously, (2,525,411 tons to 6,500.674 tons from 2008 to 2013). It was also becoming more efficient; cereal yields, at least, increased by 56% over the same period. Despite progress in recent years, wheat has underperformed over the past decade and the same strides made in productivity by other countries have not been replicated in Iraq. Low-yielding varieties, droughts in rain-fed areas, low soil fertility, and soil salinity in irrigated areas all pose major challenges.

An estimated 3.2 million tons of wheat were harvested in 2015, which was down from 2014 but 8.4% higher than the past five-year average, largely due to favorable weather conditions. Nearly the same amount of wheat had been purchased by the Iraqi Grain Board from by mid-August 2015 at the subsidized rate of 600 USD/ton, which was down from 3.4 million tons purchased in 2014. In 2015, USDA projected that Iraq would continue to experience a long-term shortfall in wheat production and that it would need to import 3.8 million tons in 2015-2016, followed by larger quantities each year after, including 4.0 million tons of wheat in 2016-2017 and 4.1 million tons of wheat in 2017-2018. By 2024-2025, it projected that Iraq will require 4.9 million tons of wheat imports annually. According to FAO, cereal import requirements were expected to be stable in 2015/16.

Domestic wheat is purchased by the Grain Board of the Ministry of Trade in order to redistribute it to the Iraqi population through the Public Distribution System (PDS). Iraq has placed special emphasis on wheat production, and the government has committed to supply each Iraqi citizen with nine kilograms of flour per month under the PDS system. Achieving these goals is a challenge, however, as Iraq has produced approximately half of the wheat it has required in recent years.

Anecdotal evidence from the field indicates that up to 600,000 tons of wheat may have been produced in areas controlled by ISIS or areas newly liberated from ISIS (in Ninewa, Salahed, Kirkuk, Diyala and Anbar Governorates). Areas that were liberated from ISIS in 2015 and 2016 also contributed to half of Iraq’s production of cereals. As a result, future production is likely to depend how long it takes these areas to recover.

Production of wheat is optimal in rain-fed areas, however, irrigated areas account for a quarter of wheat production. Ninewa Governorate, where rain-fed agriculture predominates, has been most productive wheat-producing region, accounting for 27% of Iraq’s total. These are the areas where ISIS control has been strongest, and has given the group large proportion of Iraq’s wheat production. At its height, ISIS was estimated to have controlled 40% of Iraq’s wheat production.

"Iraq will require 4.9 million tons of wheat imports annually by 2024-25"
The Impact of ISIS on Agriculture

- The ISIS invasion is estimated to have reduced Iraq’s production capacity by at least 40%.
- Subsidies, inputs have been disrupted in ISIS-controlled areas.
- Agriculture may be an important income source for ISIS and despite many challenges, harvests have been favorable in their territories.
- Negative long-term effects are very likely due to the lack of quality seeds and inputs.
- Where ISIS has lost territory, they have tended to follow a scorched-earth strategy, destroying infrastructure and resources as they retreat.
- Agriculture has been important part of ISIS’s military strategy, with infrastructure and facilities used in battle and disruptions to supply chains and production aimed at inflicting losses on opponents.

The conflict with ISIS has had a number of short and long-term consequences on agricultural production in Iraq; however, it will be difficult to reliably estimate the extent of damage until a large-scale assessment can be done. According to Iraq’s Ministry of Agriculture, ISIS may have reduced Iraq’s agricultural production capacity by 40% and destroyed its goals for self-sufficiency. These are just estimates, however, and there is little systematic data available to understand the ISIS’s impact apart from assessments conducted in the specific areas they have recently abandoned. Iraqi government institutions responsible for collecting agricultural statistics no longer function in ISIS-held areas and information collected by ISIS itself would likely be unreliable even if it did exist.

On one hand, accounts from IDPs and damage assessments of areas liberated from ISIS control suggest large-scale destruction associated with the group; however, there is also likely a combination of short and long-term consequences associated with the conflict. For example, the takeover of Mosul in June 2014 occurred just after harvest, which caused many farmers to lose their crops while at the same time ISIS confiscated 1 million tons of grain, and that denied payment to 400,000 farmers leading to 200 million USD in lost revenue.
same time, disrupting the 2015 planting cycle. ISIS confiscated 1 million tons of grain, which it sent to Syria for milling. In the process, it denied payment to 400,000 farmers and led to an estimated 200 million USD in lost revenue. Subsequent displacement, looting, and destruction of agricultural infrastructure (silos, storage facilities, pumps, irrigation systems, electrical transformers, machinery, and greenhouses) in many areas have caused long-term damage to the sector that will take years to recover.

There will likely be a number of long-term effects resulting from a lack of market access and investment. ISIS-held areas have been effectively cut off from support systems and markets in the rest of the country. The government has refused to distribute subsidized seeds, fertilizers and fuels to ISIS-held areas. Limitations were also placed on supporting areas near ISIS-controlled regions to avoid potential exploitation by the group. Unwilling to accept that their support could further fuel the conflict, the Ministry of Agriculture focused on supporting more stable areas in the south of the country. As a result, an alternative economy has emerged in territories controlled by ISIS with its own structures and incentives.

Agriculture in ISIS-controlled areas has been significantly different than what many Iraqi farmers were accustomed to, and policies imposed by the group may have made it harder for many households to earn a living. For example, ISIS has not provided high-quality inputs, such as seeds, that farmers used to receive from the government. Subsidies that farmers used to receive have also been eliminated and taxes on production have increased. For individual households, these effects have been coupled with higher costs of living. Road closures have severely disrupted supply lines, raising food prices (particularly in Anbar, Kirkuk, Nineawa, and Salahaldin Governorates), and have created shortages of fresh produce (particularly fresh fruit, meat, eggs, and dairy) in local markets.

Still, the effects of the group agricultural production, particularly in areas they still control, is not clear. A recent analysis using remote sensing suggests that agriculture in ISIS-held Iraq has fared better than previously estimated. For example, remote sensing data suggests that winter grain harvests in ISIS-held territories may have been significantly higher than the pre-crisis average. Along these lines, there is evidence to suggest that ISIS has tried to leave agricultural infrastructure intact in many areas as it represented a strategic asset. Agricultural production, particularly wheat and barley, have grown in importance, making the group more resilient as other one-time sources of income have diminished in profitability. Accordingly, such estimates calculate that ISIS has likely been able to produce a surplus of 1.6 million tons of grain in the territories it holds in Iraq and Syria and may have earned tax revenue of up to 56 million USD in 2015 alone. If this is the case, wheat production may have been as important a source of revenue to the group as oil.

Additional anecdotal evidence suggests that ISIS has encouraged agriculture to an extent or has at least sought to provide incentives to ensure that farmers do not completely abandon production. While coercion and repression have been important elements of economic production in areas held by ISIS, the group has been responsive to the needs and demands of farmers. For example, ISIS reportedly had large stockpiles of wheat in the summer of 2016, which led to decreased demand on the market. Farmers expressed frustration at their inability to sell their harvests and in response, ISIS began to buy their wheat again, at rates considered generous and above normal market rates.

Regardless of whether ISIS has been able to maintain agricultural production and profit from it, its objectives have been short term, and short-term productivity has continued at the expense of the sector’s long-term sustainability. Most notably, the quality of seeds used in planting will decline after three to four cycles of planting, leading to lower yields. Dependence on irrigation systems, which have deteriorated under the group’s administration, poses long-term challenges as well.

While agriculture in parts of Iraq currently under ISIS control may have fared better than previously expected, the best estimates of what ISIS’s long-term impact may be derived from damage assessments in areas that have been recently liberated. An assessment by FAO...
published in February 2016 found extensive long-term damage to agriculture in areas that had been under ISIS control. For example, the assessment found that between 70-80% of land planted with corn, wheat, and barley was damaged (leading to lower yields) or destroyed in Salahadin Governorate. Approximately 32% of land dedicated to wheat production was damaged and 68% was lost in areas assessed in Ninewa Governorate. For livestock, an estimated 80% of sheep and goats, 50% of cows, and 90% of poultry throughout the entire area assessed had been lost. Fish production was reported to be down by 20-80% depending on the areas assessed.

The same assessment indicated that damage in areas that had been under ISIS control occurred due to a combination of neglect and exploitation. For crops, a lack of fertilizers and quality seeds, damage to irrigation systems, an absence of government support for inputs, and a reduction of the labor pool had the most damaging effects. Losses for livestock were more immediate; households tried to flee with their flocks and herds, but could not take all of their animals. When they returned, they found that the animals they left behind had been looted, slaughtered, or stolen15.

Along these lines, ISIS has placed particular emphasis on looting farm equipment in the areas it has taken over29. According to a media report from November 2014, ISIS seized 290 harvesters, 2,600 tractors, 7,488 other pieces of equipment in Ninewa, effectively bringing agricultural life in the Governorate to a halt5. ISIS took tools and equipment with them when they retreated, and destroyed what they could not take12.

Efforts to restore the agricultural economy may have to confront damage on a massive scale with effects that extend well beyond the destruction of infrastructure during the course of fighting or the exploitation of resources for funding or profit. The severity of the damage as well as the motives behind it makes it unique. According to an article in Foreign Policy, ISIS has pursued a “scorched-earth strategy” which is designed to make areas unliveable for inhabitants. The conflict has also seen a situation in which agriculture has literally been militarized. Irrigation networks have been ripped out of the ground to make pipe bombs and silos and seed stores have been used as watchtowers. Foreign Policy estimates that ISIS had deliberately worked to ensure that “A million acres of prime arable land [had] been rendered unusable.” It adds that the destruction has been deliberate but without an apparent strategic purpose other than to inflict long-term punishments on its opponents. “Iraqis have seen their land purposively destroyed by their retreating enemies for no obvious military end.”29 This wanton destruction may explain the extent of damage in areas taken back from the group, which extends from the deliberate destruction of greenhouses poisoning as well as pumping facilities and wells used for irrigation9.

In line with the militarization of agriculture and collective punishment other reports suggest that the destruction of crops and infrastructure has become part of a strategy of economic warfare14. Barley crops in areas controlled by ISIS have been largely destroyed, prompting the government to raise prices in the face of shortages. Overall, barley production has been down 40%, resulting in USD 20 billion in lost income4. Along similar lines, another means of economic warfare has centred on controlling water resources. Early after its takeover of parts of Iraq and Syria, ISIS began using water cuts as a weapon20.
Finally, damage to institutions that support the agricultural sector may take time to repair. For example, some of the first buildings the group burned and looted after taking over new territories were the agricultural directorates in Salahuddin and Mosul\textsuperscript{14}. ISIS has reportedly confiscated agricultural lands and resold them\textsuperscript{8}. While efforts to reallocate land during the group’s occupation are unlikely to be recognized post-liberation, land titling and ownership issues may create additional barriers to return for households.

“Barley production has been down 40\%, resulting in USD 20 billion in lost income in 2016.”
Conclusion and Recommendations

• Build on experiences in Kurdistan Region of Iraq (KRI) about agriculture in post-conflict recovery and development
• Do damage assessments where possible
• Increase support to small farmers that lost their stocks
• Restore agricultural markets to make value chains function again
• Restore pre-conflict supports, including the PDS and input; however, develop plans to better target benefits in the future.
• Diversify crops and introduce new technologies for a more productive sector.

In addition to damage caused by fighting and ISIS rule, the effects of the crisis have made investing in agricultural production additionally challenging, with the government forced to spend more on assistance to refugees and IDPs. Still, some efforts to reinforce and invest in the agricultural sector have taken place, particularly in the KRI, which while hosting millions of IDPs, has been further removed from the most destructive aspects of the conflict. The experience in the KRI provides some early indications of the role that agriculture could play in post-conflict recovery and development.

In KRI, neglect of the agricultural sector has accompanied decades of oil-driven growth, which saw rural populations abandon farms and move to cities where they were able to find low-skill jobs that offered regular incomes. Recently, however, diminished opportunities in other sectors as well as higher investment in agriculture, has not only induced households to remain engaged in agriculture, but encouraged ones that abandoned farming to take it up again. Investment was necessary to encourage households to return to farming, although more could be done still. While the agricultural sector in the KRI has fared better than in other parts of Iraq, levels of investment lag behind those of other food-importing countries. (Investment in agriculture rose to 4% of the government’s budget in 2015 from 2%, which is still below the internationally recommended level of 10%.)

Restoring Iraq’s agricultural sector is likely to entail a combination of short and long-term strategies that may differ over time. Of course, the most immediate need is to ensure that areas that have been removed from ISIS control are inhabitable so that the populations that fled can return safely. At a minimum, this entails clearing land of ordinance and restoring basic services and security. Longer-term humanitarian assistance in addition to development aid will likely remain a necessity until farmers can restore their livelihoods. Plans to reform the agriculture sector and improve its productivity and competitiveness, which were formulated before the start of the conflict, should not be abandoned, however.

Quantitative damage and loss assessments will likely play a critical role in ensuring that appropriate support can be provided, as will be supporting the Central Organization for Statistics and the Ministry of Agriculture to resume their regular national surveys. Destruction by the conflict varies by region, and it has also been carried out with a number of different intentions. Looting and intentional damage to land infrastructure are brazen forms of destruction, but such highly-visible instances should not overshadow less obvious effects on the sector caused by the conflict. These may include markets for inputs and outputs that have been altered, seed stocks for future harvests that have been exhausted, and value chains have been eroded. In the short term, it is necessary to understand needs in specific areas that ISIS has left. After the group has been defeated, it will be necessary to understand the effects of the conflict on the country as a whole, including the types of damage that may have been inflicted to the country’s economy as a whole, which may entail visible forms of damage in areas that it did not control.

For farmers that lost their stocks, direct support in the form of seeds and livestock as well as inputs, fertilizers, veterinary care and equipment, is likely necessary. At the same time, mechanisms should be put in place to ensure that households have the resources to
invest in livelihoods themselves. These may include community credit mechanisms such as savings and loans institutions to provide credit and drive investment in livelihoods. It also means ensuring that Iraq has the capacity to sustain a healthy agricultural sector through long-term investment in infrastructure and training.

Restoring agricultural markets, particularly for wheat, may mean not only ensuring demand and consumption at the household level, which includes support through the PDS, but providing support to other points in the value chain as well. Support to bakers, such as loans or grants to increase their rolling stock of wheat flour, and partnerships with millers and silos may help in this regard. As the situation in the country stabilizes, however, it may be in the best interest of the sector to remove some of these supports to ensure that markets begin to develop again. The PDS should remain as a pillar of food security, but over time it should be targeted increasingly to those that need it most. Similarly, protective measures and subsidies may encourage domestic production and consumption in the shortterm but they should eventually be abandoned to encourage higher yields and improvements in quality as production recovers.

While wheat has been and will remain Iraq’s staple crop, there are opportunity costs associated with the emphasis placed on its production. Outside of rain-fed areas, production is resource and labour intensive and comes at the expense of diversifying production, including producing crops and livestock that Iraq could export to other countries, or at a minimum, that it would no longer have to import. Rather than postponing an eventual transition to crops that are better suited for different soil types and rainfall zones, an emphasis should be placed on utilizing the disruptions caused by the conflict to switch to more efficient practices now.

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