

Agriculture in Syria

Kerina Tull

University of Leeds Nuffield Centre for International Health and Development

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Question

What is the current situation with regard to agricultural development in Syria?

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1. Overview

Although the agricultural area of the Syrian Arab Republic is spread over large areas of the country, the agricultural sector is facing many difficulties in light of deteriorating security conditions and the high cost of farming. Key findings are as follows:

- The country's diverse crops reflect its environmental and geographical areas, and include wheat, barley, legumes, olives, grapes, cherries, and citrus fruits.
- Crops are susceptible for several seasons to severe ecological stresses, however, such as frost during initial growth stages, or to rainfall retention and high temperatures during the maturity stage.
- Although the country is still plagued by frequent droughts, results for 2017 show an improvement in vegetation conditions in the northern crop-growing areas of Aleppo, Idlib, Hama and Al-Hassakeh.
- However, "severe" moisture stress, affecting 55 to 85 per cent of crops, has been observed in cropland areas across the southern part of Idlib and in some parts of central and northern Aleppo (FAO GIEWS, 2017a).

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- Water and its sources are an essential factor in the development of the agricultural sector, as well as for livestock rearing. Due to the scarcity of resources and the low natural productivity of inland fishery, the fishery and aquaculture sector plays a minor role in Syrian economy.
- Since the crisis, many irrigation canals have been destroyed. Groundwater use in Syria is heavily overexploited, yet water resources receive less attention than the effects of food and income security.
- Limited study results show that water issues rank highly in many sub-districts in Idleb and Rural Damascus governorates: because of the high cost of other irrigation methods, 45 per cent of agricultural sub-districts assessed by the non-government, non-profit organisation Assistance Coordination Unit (ACU) depend on rainwater for land irrigation (ACU, 2017: 34).
- Before the outbreak of the crisis in 2011, the sector was a source of livelihood opportunities for half of the population (FAO, 2016: 1). Today, non-IDP (internally displaced people) households still living in rural areas continue to depend on agriculture as their main livelihood, with around 80 per cent involved in annual crop production (FAO, 2017: 4).
- Approximately 40 per cent of IDPs interviewed in the recent 'Counting the Cost' national survey have stopped crop production entirely due to high prices of inputs and insecurity (FAO, 2017: 6). To decrease reliance on low-quality and expensive smuggled vegetables, approximately a third of all residents in Rural Damascus survive by growing crops on rooftops after buying seeds from other areas, despite the high prices (Syria Untold, 2015).
- Crop production is impacted by high labour costs, shortages of workers, crop destruction and fragmented markets, with disrupted supply chains and severe damage to grain silos and flour mills.
- Data from FAO and WFP reveal that the area planted with cereals in the 2015-16 cropping season was the smallest to date.
- Bread is the staple of the Syrian diet, and the Al-Hassakeh governorate in the north-east is still considered to be the reservoir of wheat production in the country. However, currently there is a conflict here called the "wheat battle," which is just as important as the ongoing war between conflicting parties in the region.
- More than half of Syria's public bakeries have been damaged since the start of the crisis, increasing bread prices by up to 1000 per cent in the hardest hit areas (WFP, 2016).
- Today, Syria has turned from a country having strategic self-sufficiency in wheat, to an importer.
- Livestock rearing has also decreased: herders lack animal feed, and veterinary services have been significantly reduced. As a result, many livestock are unvaccinated and so risk spreading diseases into neighbouring countries.
- Food production has dropped by 40 per cent, compared to pre-conflict levels (WFP, 2016) and is at a record low.
- The state system that once subsidised and provided farmers with seeds, as well as purchased their crops, has been restricted by the war.
- According to 2017 DYNAMO study results, there are no agricultural pharmacies (that provide basic items needed for agriculture) within 24 assessed sub-districts, even though 19 of them are listed as agricultural sub-districts.
- Despite six years of war, agriculture remains a key part of the economy, however. The sector still accounts for an estimated 26 per cent of gross domestic product (GDP), and represents a "critical safety net" for the 6.7 million Syrians – including IDPs - who still remain in rural areas (FAO, 2017: 4).

- Even though the crisis is not over, the conditions for investing in the recovery of the sector are present in many areas of the country. There is a possibility for establishing livestock development projects within nearly three-quarters (73 per cent) of assessed sub-districts (ACU, 2017: 29).
- Future Syrian agricultural research development programmes for farmers include: planning for future harvests; training with the latest technology - even for farmers who have decades of experience - in order to focus on new ideas, and introducing scientific advances and discoveries.
- Charities and non-government organisations (NGOs) plan to eventually expand into animal husbandry, providing vocational training for breeders to raise sheep and goats, and assist them with feed and forage.

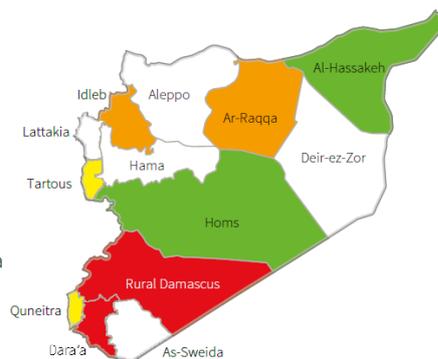
Most of the evidence concentrates on crop production – mainly wheat. This report includes findings from BSG areas such as Ar-Raqqa, Damascus, Deir-ez-Zor, Hama, Homs, Idleb, and Rural Damascus, as well as hard-to-reach (HTR) areas, e.g. Al-Hassakeh. **Newly accessible** areas in Aleppo, Az-Zabdani, Lattakia, and Tartous governorates are also included. Results for areas that have seen relatively little fighting e.g. As-Suwayda (Sweida), and the largely destroyed Quneitra are also included.

2. Influences on crop development

DAMAGE AND LOSS TO PERENNIAL CROPS

Damage and loss (USD million)

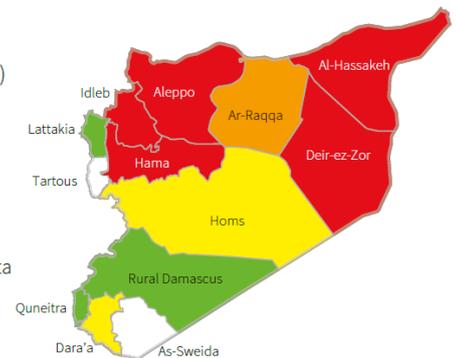
- 0-50
- 50-100
- 100-400
- >400
- Incomplete/questionable data



LOSS OF ANNUAL CROPS

Loss (USD million)

- 0-200
- 200-400
- 400-550
- >550
- Incomplete/questionable data



Source: FAO, 2017: 7¹

¹ **Perennial crops** include almonds, apples, apricots, cherries, citrus, figs, grapes, nuts, olives, peaches, pears, pistachios, plums and pomegranates.

Annual crops include a range of important food (wheat), fodder (maize and barley) and cash (cotton, tobacco, spices and sugar beet) crops.

Geography and climatic issues

- The country is bordered in the north by Turkey, in the east and southeast by Iraq, in the south by Jordan, in the southwest by Israel, and in the west by Lebanon and the Mediterranean Sea. The Balikh is the longest Syrian river, while parts of the massive Tigris and Euphrates also pass through it. Syria shares most of its rivers with other countries.
- The agricultural area of the Syrian Arab Republic cover large areas of the country (ACU, 2017:33).
- The northeast and the southern parts of the country are important agricultural areas because of the abundance of water and favourable climate.
- The country's diverse perennial and annual crops reflect its environmental and geographical areas (Hanna, 2016).
- The climate is Mediterranean, characterised by a relatively short rainy and cold winter (December–March), and a dry and hot summer (June-August). Crops are susceptible for several seasons to severe ecological stresses, such as frost, during initial growth stages, or to rainfall retention and high temperatures during the maturity stage. Crops are also exposed to irregular rainfalls, in terms of amount or distribution throughout growth season (GCSAR, 2013).
- Although there have been a series of severe droughts starting in the late 1990s, April 2017 rainfall totals in Syria were largely '*above average to average*' compared to the long-term average (LTA) of 2001-2016 (FAO GIEWS, 2017a).
- ASI² recordings for April 2017 show '*improvement*' in vegetation conditions in crop-growing areas of Aleppo, Idleb, Hama and Al-Hassakeh (FAO GIEWS, 2017b).
- However, signs of *moisture stress* were still present in these governorates throughout three dekads³ of April 2017: by the last dekad of the month, signs of "severe" moisture stress, affecting 55 to 85 per cent of crops, was observed in cropland areas across the southern part of Idleb and in some parts of central and northern Aleppo (FAO GIEWS, 2017a).
- '*Below average precipitation*' was observed in large areas of eastern and southern parts of Al-Hassakeh; parts of Rural Damascus, As-Suwayda and Homs; and pockets of Aleppo, Ar-Raqqqa, Idleb and along the Euphrates River in Deir-ez-Zor governorates (idib).
- However, the southern and south-western parts of Damascus, Quneitra, Dar'a, Tartous and Lattakia continued to receive '*relatively moderate*' rains in December 2016, which resulted in *healthy crop development* throughout January 2017 (FAO GIEWS, 2017a). In Al-Hassakeh and Deir-ez-Zor, '*healthy vegetation cover*' increased from December 2016 to January 2017 (FAO GIEWS, 2017b).

² The Agricultural Stress Index (ASI) helps to show how "stressed" crops are (i.e. percentage of cropland area affected by drought) by combining vegetation condition and temperature variables. However, since the ASI is based on remotely sensed data only, there is no confirmation on what crops have been planted (FAO GIEWS, 2017b).

³ Every month has three dekads, such that the first two dekads have 10 days (i.e., 1-10, 11-20), and the third is comprised of the remaining days of the month. Therefore, the length of the third dekad of each month is not consistent and varies from 8-11 days, depending on the length of the month (Joyce et al., 2014).

Water area and irrigation

- Water is an essential factor in the development of the agricultural sector. Due to irregular rainfalls, the agriculture sector has to rely heavily on irrigation - in particular in the northern governorates of Al-Hassakeh, Aleppo and Ar-Raqqa, as well as Deir-ez-Zor along the Euphrates (FAO, 2017: 12).
- Latest estimates show that agriculture accounts for 87 per cent of the water withdrawn from Syria's aquifers (containing groundwater), rivers and lakes (FAO AQUASTAT, 2012).
- However, the water area in Syria (including marshes) consists of only 161,000 ha (1,610 km²), which represents approximately 0.9 per cent of the total area of the country (FAO, 2017: 4). In southern Aleppo, the groundwater level has fallen by 1.5 m/year over the last 25 years (Aw-Hassan et al., 2014: 207).
- Renewable water resources are estimated at 0.0808 ha (808 m³)/capita/year (ibid), which is below the water scarcity threshold of 0.1 ha (1000 m³)/capita/year (Roudi-Fahimi et al., 2002; FAO, 2017: 12).
- With a rate of population growth consistent with the United Nations' medium variant population projection (UN-DESA, 2013: 143), the country is estimated to approach the *absolute* water scarcity threshold of 0.05 ha (500 m³)/capita/year by 2050 (Aw-Hassan et al., 2014: 205).
- Half of Syria's annual renewable water resources originate from cross-border flow, with the majority of it flowing in from Turkey by way of the Euphrates (Aw-Hassan et al., 2014: 205). However, both climate change and developments in neighbouring countries have already reduced water resources even further.
- People in neighbourhoods held by the Syrian regime in Deir-ez-Zor do not receive enough water to meet their minimum daily needs. Currently, water is pumped into the home network in the city for only a few hours over few days, prompting civilians to dig wells for water extraction (ACU, 2017: 66).
- Previous research showed that farmers allocated water to their crops in an economically rational manner "in the short run" (Aw-Hassan et al., 2014: 213). However, according to more recent analysis, 20 per cent of households have lost access to irrigation entirely (FAO, 2017: 12).
- Currently, forty per cent of households still have access to irrigation, but face higher costs due to increased prices and lower quantities of fuel, resulting in the use of a smaller amount of water (ibid).
- In the 'Counting the Cost' survey, 60 per cent of households reported current significant damage to infrastructures such as irrigation canals, and this figure rose as high as 70–90 per cent in some governorates concentrated in the most irrigated areas, i.e. Al-Hassakeh, Aleppo and Ar-Raqqa (FAO, 2017: 13).
- Syria Dynamic Monitoring (DYNAMO) study findings confirm that irrigation problems rank highly in many sub-districts in Idleb and Rural Damascus governorates (ACU, 2017: 33).
- Because of the high cost of other irrigation methods, 45 per cent of sub-districts assessed by the Assistance Coordination Unit (ACU) depend on *rainwater*, such as Markada in Al-Hassakeh, Ziyara in Hama, Al-Khashniyyeh in Quneitra, Qourqeena in Idleb, Tall Refaat in Aleppo - despite the fact that these sub-districts are agricultural sub-districts (ACU, 2017: 34).
- Deir-ez-Zor centre, Abu Kamal, Jalaa and Susat sub-districts in Deir-ez-Zor depend completely on Euphrates *river water* (ibid).

- Groundwater-based agriculture comprised of 53 per cent of the total irrigated land before the war (MAAR, 2010). Nowadays, groundwater in Syria is heavily overexploited: Madaya in Rural Damascus, Bennsh in Idleb and Muharda in Hama depend completely on *groundwater* for land irrigation (ACU, 2017: 34).
- However, the effects of such expansion on the sustainability of water resources receive less attention than the effects on food and income security in rural livelihoods (Aw-Hassan et al., 2014: 205).

Livestock

- Awasi sheep comprised the majority of the livestock population before the crisis; cattle and goat populations were smaller (FAO, 2017, 9). Commercial poultry was an important source of employment (FAO, 2017: 9).
- Today, however, livestock numbers have decreased as herders lack animal feed. Veterinary services have been significantly reduced; as a result, many livestock are not vaccinated, and so risk spreading diseases into neighbouring countries (FAO, 2016: 1).
- The loss of animals, either by death due to lack of water, poor living conditions, killed or stolen is particularly high in Al-Hassakeh, Deir-ez-Zor, Lattakia, Quneitra and Rural Damascus (FAO, 2017: 9).

Economy and production loss

- Due to the scarcity of resources and the low natural productivity of inland fishery, the fishery and aquaculture sector plays a minor role in the Syrian economy (FAO, 2017: 10).
- Before the crisis, the agricultural sector was a source of livelihood opportunities for half of the population (FAO, 2016: 1). Today, agriculture remains a key part of the economy (ACU, 2017; FAO, 2017: 2) - albeit severely weakened by six years of war.
- Livestock also remains a main source of income in rural areas (FAO, 2017: 4): approximately 80 per cent of non-IDP (internally displaced people) households still living in rural areas are involved in annual crop production; 60 per cent in perennial crop production, and 60 per cent also in livestock rearing (FAO, 2017: 4). For IDP households, the percentages are lower (ibid).
- The sector accounts for an estimated 26 per cent of gross domestic product (GDP), and represents a “critical safety net” for the 6.7 million Syrians, including IDPs and poor households, who still remain in rural and peri-urban areas (FAO Representation in Syria, 2016; FAO, 2017: 4).
- However, livestock registered the second largest share of lost economic production (after annual crops) (FAO, 2017: 5). Conversely, this subsector accounted for the highest proportion of damage (as manifested in the value of livestock deaths) amounting to USD 5.5 billion (FAO, 2017: 5 & 9).
- ‘Counting the Cost’ figures estimate that USD 16 billion has been lost in terms of **production (economic loss)** overall (FAO, 2017: 5), along with damaged and destroyed assets and infrastructure within the agriculture sector.

3. Crop and food production

- Although the agricultural sector still sustains 50 per cent of food supply in Syria (FAO Representation in Syria, 2016), food production is at a record low. Figures show a reduction of 40 per cent, compared to pre-conflict levels (WFP, 2016).
- The sector faces many difficulties, including: soaring prices of fuel (if available), especially in Aleppo and Idlib; the high cost of once-subsidised seeds and animal feed, and lack of specialised staff (ACU, 2017: 33; Mercy Corps, 2017).
- Crop production is also impacted by high labour costs, shortages of workers, and fragmented markets, with disrupted supply chains (FAO, 2017: 5).
- These limited and costly production activities are **raising food prices**, causing approximately half the population remaining in Syria are unable to meet their daily food needs (FAO, 2017: 1). Current analysis records the number of people in need (PINs) as four million within 105 assessed sub-districts (ACU, 2017: 11).
- A decline in agricultural production was registered in the Al-Dana sub-district in Idlib due to the spread of IDP camps on a wide agricultural area (ACU, 2017: 29).
- Regime forces do not allow farmers' access to their land (ACU, 2017: 33; ESCWA & St. Andrews, 2017: 17). Crop destruction is also an issue (FAO, 2017: 5): in the sub-district of Az-Zabdani in Rural Damascus the forces almost daily cut down the fruit trees, which constitute 90 per cent of farming in the sub-district (ACU, 2017: 33).
- Agriculture, and the livelihoods that depend on it, have suffered heavy losses. However, national survey results show that the number of households that have lost access to different types of assets necessary for crop and livestock production is relatively low at 10 per cent (FAO, 2017: 12).
- The Syrian regime policy of 'siege and starvation' has increased awareness of the importance of farming all available agricultural spaces, even within city residential blocks (ACU, 2017: 33). To decrease reliance on low-quality and expensive smuggled vegetables, approximately a third of all residents in Rural Damascus survive by growing crops on rooftops after buying seeds from other areas, despite the high prices (Syria Untold, 2015).
- Successful roof farming faces many obstacles, however, including: difficulty of moving earth to the roof without specialist equipment; the lack of water; difficulty in acquiring suitable seeds, as well as danger of aerial bombardment (ibid).

Cereals and bread production

- Wheat is one of "the most strategic crops" in Syria, as it is the base for flour used to make bread, which is a staple of the Syrian diet (WFP, 2016; Mercy Corps, 2017).
- In general, wheat cultivation has followed an "up and down pattern": the long-term trend was positive from 1966 to 2010 (Aw-Hassan et al., 2014: 205), however, after Syria's wheat harvest reached 3.4 million tonnes in 2011, production fell to 1.7 million tonnes in 2016, as stated by government figures (Enab Baladi, 2017).
- The 'Crop and Food Security Assessment Mission' conducted by the FAO and the WFP shows that the area planted with cereals in the 2015-16 cropping season was the smallest ever (FAO, 2015).
- According to FAO Food Price Monitoring and Analysis data, the continued conflict in the main cereal producing areas (in the north east of the country) together with poor rainfall, decreased the 2016 wheat harvest by 37 per cent compared to the relatively good output of 2015. This

was approximately 55 per cent lower than the pre conflict average from 2007-2011 (FAO FPMA, 2017).

- Wheat output for 2017 is also expected to remain below the pre-conflict average level (FAO FPMA, 2017). The Syrian Ministry of Agriculture and Agrarian Reform (MAAR) predicts that the wheat production in Al-Hassakeh⁴ for the current season will only reach 600,000 tonnes, compared to 1,471,000 tonnes in 2007, in an estimated area of 396,500 ha (3,965 km²), compared to 663,086 ha (6,631 km²) in 2007 (Enab Baladi, 2017).
- This part of Syria is currently witnessing a conflict called “wheat battle,” which is no less important than the ongoing war between the conflicting parties in the region (ibid).
- Nevertheless, the Economic Commission plans to buy 200,000 tonnes of wheat from farmers there this year, which will make the region achieve self-sufficiency in wheat (ibid).
- Since the start of the crisis, infrastructures such as grain silos and flour mills have been destroyed (FAO, 2017: 5); 47 per cent of public bakeries have been damaged (ACU, 2017: 25), increasing bread prices by up to 1000 per cent in the hardest hit areas (WFP, 2016).
- The continuing war and climate changes has turned Syria from a country having a strategic self-sufficiency in wheat, to an importer (ESCWA & University of St. Andrews, 2017: 17).

Vegetable growth and production

- In Syria, vegetables such as cucumber and beans are generally ruled by market forces, including the absence of price support (Aw-Hassan et al., 2014: 211). For these crops, differences between actual irrigation levels, profit maximising levels, and technically recommended levels are much narrower than for other crops, such as wheat (ibid).
- Farmers have a lower incentive to focus on vegetable production because it entails greater risk; most vegetables need to be sold directly after harvest as vegetable prices fluctuate in line with market conditions (ibid).
- As the state system that once purchased farmers’ crops has been restricted (Mercy Corps, 2017), Syrian farmers have been encouraged to export fruit and vegetables to Russia since 2016, according to media reports (Agroinfo, 2017).
- By the end of 2017, the volume of exports of fruits and vegetables from Syria could be 6,000 tonnes (ibid). Next year, this figure could be increased by 12, or even 15 times (ibid).

4. Current assistance programmes

- Farming before the conflict was supported by the Syrian regime, which in turn received support from international organisations (ACU, 2017: 21). The General Commission for Scientific Agricultural Research (GCSAR), which is affiliated with the Syrian government, is currently developing its research programmes in line with the nature of Syrian agriculture and its development priorities (Hanna, 2016).
- Development projects started in many liberated areas in a trial to achieve stability in food security sector because humanitarian assistance provided did not meet civilians’ needs (ibid).

⁴ The Al-Hassakeh governorate in the north east is considered as “the reservoir of strategic material for Syria” since it contributes to 36 per cent of wheat production in the country (Enab Baladi, 2017).

- Compared to previous monitoring results (DYNAMO 5), the percentage of assessed sub-districts with active development projects increased from 41 to 62 per cent during the previous six months (ibid).
- There is a possibility for establishing livestock development projects within 73 per cent of the assessed sub-districts (ACU, 2017: 29). However, no active development livestock projects were found within 13 sub-districts in Al-Hasakeh, Ar-Raqqa, Dar'a and Eastern Aleppo where the livestock are in "miserable" conditions (ACU, 2017: 31).
- Livestock development projects are implemented only in few sub-districts. This is because food baskets do not include meat; most families cannot afford to buy meat because of its rarity and high price (ibid). This, among other factors, leads to undernutrition among civilians especially women and children (FAO Representation in Syria, 2016: 43; ACU, 2017: 31; FAO, 2017: 9).
- ACU are cooperating with Homs LC in supporting the agricultural sector and livestock care, especially after the big retreat in livestock production. Two current Qatar-funded development projects include fattening sheep and calves, as well as providing livestock medicine, vaccines and fodder to cattlemen at low prices.
- Croplands ready to be planted with strategic crops (such as potatoes, wheat and legumes) form 80 per cent of the assessed land area within assessed sub-districts (ACU, 2017: 29). To date, 48 assessed sub-districts have been planted with these crops, mainly in Idleb, Aleppo and Rural Damascus (ibid).
- Irrigation projects have been implemented in approximately a third (33 out of 105) of the assessed sub-districts (ACU, 2017: 34). However, there are no details available concerning their successes.
- Also, there are no active development projects present in 38 per cent of the assessed sub-districts, including all the assessed sub-districts in BSG Ar-Raqqa and Deir-ez-Zor where humanitarian organisations are not allowed to work.
- According to the latest DYNAMO study results, there are no agricultural pharmacies (that provide basic items needed for agriculture) within 24 sub-districts assessed, even though 19 are agricultural sub-districts, and that there are stock-breeding activities in 15 of them (ACU, 2017: 35). Farmers in nine sub-districts with difficulties in access to agricultural pharmacies, include Areesheh in Al-Hassakeh, Tell Abiad in Ar-Raqqa, Banan and Maskana in Aleppo, and Kafr Nobol in Idleb (ibid).
- The non-government, non-profit organisation Assistance Coordination Unit (ACU) aims to reinforce farmers' commitment to their lands by ensuring that their current crops are sold, by encouraging them to cultivate crops for the next season (winter crop support in Homs). This programme can then provide flour for bread to areas in need (Hanna, 2016).
- Since 2011, the FAO has been operating in 13 of Syria's 14 governorates, supporting the livelihoods of more than two million Syrians in rural and peri-urban areas, through a wide range of development activities (FAO, 2016: 2).
- Their '2016 Syria Humanitarian Response Plan' (ibid) centres on: staple food production through seed distributions and training; support for winter cereal (e.g. wheat and barley) production; "Family farming" i.e. household nutrition and income support through backyard food production - kitchen garden kits include seeds and seedlings, fertiliser and basic tools to help families plant small vegetable allotments for their own consumption in both the summer and winter months (Mercy Corps, 2017).
- Micro-gardening kits and poultry production packages are also provided for displaced families, as well as conditional cash assistance (FAO, 2016: 2).

- Programmes increasing and protecting livestock assets through vaccination and treatment campaigns, distribution of animal feed and small livestock, and building veterinary capacity have been minimising the risk of transboundary animal disease outbreaks (FAO, 2016: 1).
- Rehabilitation of agricultural infrastructure is currently in operation. In 2015, 222 farmers were able to resume production on 33 ha (0.33 km²) of land thanks to the rehabilitation of solar-powered irrigation systems (FAO, 2016: 2).

5. Future considerations for development and recovery

- The agricultural sector remains essential, and will be key to Syria's future recovery (FAO, 2016: 1). However, between USD 11 and 17 billion⁵ is required to start the recovery (FAO, 2017: 5). Livestock sector recovery will account for 43–47 per cent of total recovery costs, depending on the scenario.⁶
- Even though the crisis is not over, the conditions for investing in the recovery of the sector are present in many areas of the country (FAO, 2017: 14). Such investment will not only reduce the need for humanitarian assistance, but also stem migration and encourage the return of migrants (ibid). Increasing the number of development projects is necessary because provided humanitarian assistance still does not totally meet civilians' needs (ACU, 2017: 29).
- If productive farming areas are neglected, more people will be forced to leave already depopulated rural areas making eventual recovery harder, longer and more costly to achieve (FAO, 2017: 15).
- Results show that rural households are very clear about what they require to enhance or resume their agricultural production; for annual crops, perennial crops and livestock the pattern is similar (FAO, 2017: 14). This reflects a general assumption that agricultural production can be "kick-started" effectively, even under current conditions (ibid).
- Local populations manage the largest percentage of development projects, along with local councils (LCs), local non-governmental organisations (LNGOs), and other authorities that also manage development projects. International non-governmental organisations (INGOs) administrate some projects only within Jawadiyah sub-district in Al-Hassakeh, and Sahnaya in Rural Damascus (ACU, 2017: 30).
- Therefore, the international community must also start addressing **new ways of rebuilding livelihoods** during a crisis. Despite the potential of agriculture to address mounting food availability and access constraints, very little has been invested to support recovery of the sector. Failure to provide adequate support will continue to exacerbate food insecurity, and irreversibly compromise agriculture-based livelihoods (FAO, 2017: 1).
- Irrigation sources, which include rainwater, groundwater and surface water (e.g. river water), vary from one district to another (ACU, 2017: 34). Therefore, an important consideration for

⁵ Under a "no change" scenario, the assessment estimates that the costs over a three-year period would USD 11 billion at 2016 prices. Due to an assumed partial return of rural migrants from urban areas and abroad, this total increases to USD 14.9 billion under a "partial return to peace" scenario, and to USD 17.1 billion under a "transition to peace" scenario (FAO, 2017: 14).

⁶ Annual crops account for 29–33 per cent and perennial crops 24–26 per cent, according to a formula which takes into account the level of damage which is estimated to have occurred combined with proportion of land covered (for irrigation only) (FAO, 2017:14). These costs apply to a *partial return to peace* scenario (FAO, 2017: 15).

recovery of the agriculture sector is need to adapt to **reduced use of water for irrigation**, while at the same time coping with increased temperatures and more frequent droughts (FAO, 2017: 17). **Climate smart** agriculture must also be taken into account (FAO, 2017: 19).

- One possibility for the future is that some of the services formerly provided by the government (e.g. subsidy policies for fuel and price support) may be provided by the private sector. As such, there will be a need to build the capacity of farmers to sell their own production through **value chain approaches** (post-harvest management, food processing and preservation and marketing), as well as promoting the development of income-generating activities (FAO, 2017: 19).
- Some charities and NGOs plan to eventually expand into **animal husbandry**, providing vocational training for breeders to raise sheep and goats and assist them with feed and forage (Mercy Corps, 2017). Courses will also include instruction on cheese-making and food preservation (ibid).
- The continuity of agriculture and stock-breeding requires nearby **agricultural pharmacies**. This is to provide fertilisers and seeds, as well as insecticides, veterinary medicines and other basic items needed for agriculture in addition to veterinary medicines (ACU, 2017: 35).
- Fertiliser, which was previously produced locally, must now be imported due to disruptions in the market during the conflict (ibid). High prices mean that many farmers are unable to afford it unless assistance programmes exist (Mercy Corps, 2017).
- The **high cost** of needed items and veterinary medicines (if available) heads the considerable difficulties that agricultural pharmacies face in all assessed sub-districts, followed by **unavailability** of all the necessary items in addition to lack of specialised staff, which negatively affects agriculture and stock breeding (ibid).
- Agricultural research is also important to consider. Three agriculture research centres currently operate in Syria: the Agricultural Research Centre in Hama for seed development; GCSAR, which is operational in various provinces; and the International Centre for Agricultural Research in the Dry Areas (ICARDA) in southern Aleppo province (Hanna, 2016).
- Planning for future harvests includes training farmers with the **latest technology** (Mercy Corps, 2017). This is essential as most harvest machinery in Syria is at least 10-20 years old, having been imported second-hand from Europe, and are not very fuel-efficient (USDA Foreign Agricultural Service, 2012).
- Training farmers, even those who have decades of experience, is necessary in order to focus on new ideas, and introduce scientific advances and discoveries. Using native legume and wheat varieties, which are adapted to the Syrian environment and are drought- and disease-resistant, will make it easier for farmers who would otherwise struggle to cultivate a new variety (Mercy Corps, 2017).
- The farmers can discuss crop management, e.g. recognising and controlling disease or infestations (ibid). Training on saving seeds from their vegetables to use again next season will increase yields, and allow farmers to sell their surplus in the local markets. It will also prepare Syrians to return to farming their land once the war ends (ibid).

6. References

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