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MERCY CORPS

Thematic Report

2025's Drought in Lebanon

A Dry Season for Lebanon's Farmers

November 2025

Credit: UNDP

The Lebanon Crisis Analytics Team (LCAT) provides reactive and in-depth context analysis to inform the aid community in Lebanon. The information and analysis contained in this report is therefore strictly to inform humanitarian and development actors and associated policymaking on Lebanon.

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Credit: UNDP

Introduction

Lebanon is contending with the effects of its worst drought in decades, having received roughly half its typical annual rainfall to date. This has led to record-low inflows to lakes and reservoirs, water rationing, and widespread groundwater stress. These developments have taken a particularly heavy toll on the agricultural sector, including marked increases in soil salinity and water sodicity, factors that reduce both crop quality and yields.

Government and humanitarian partners have launched awareness campaigns and a drought response plan, but their usefulness is limited by the lack of a formal drought declaration system, insufficient funding for large-scale water sustainability projects, and inefficiencies in Lebanon's water distribution network. Farmers have adapted where possible – as evidenced by the rapid expansion of drip systems, deficit irrigation, reductions in the size of cultivated areas, and smart irrigation tools – though these measures often are taken at the expense of efficiency and can add considerable monetary cost.

This paper assesses the impacts of drought on Lebanon's agriculture sector by examining coping strategies adopted by farmers and agri-businesses. It first offers an overview of Lebanon's water resources and agricultural use; examines the magnitude of the 2025 drought, its impacts on agriculture and the environment, and the adaptation strategies employed by farmers; and concludes with recommendations to guide more systematic and effective drought management.


Credit: AUB

Methodology

This study combines primary data gathering via key informant interviews (KIIs) with a desk review of secondary sources. LCAT conducted KIIs in person and remotely, depending on the availability and location of the interviewees. The KIIs were semi-structured and partially based on an interview guide covering topics such as water scarcity, farming practices, and adaptation strategies. This allowed interviewees to expand on issues they considered most relevant, while ensuring that core themes were addressed.

LCAT interviewed a diverse group of Lebanese stakeholders from several regions. To capture technical insights on climate variability and drought patterns, the team interviewed Ihab Jomaa, Head of Irrigation and Agrometeorology and Director of Tal Amara Research Station at the Lebanese Agriculture Research Institute (LARI). The team also spoke with four farmers raising different crops at varying scales across several regions:

- Georges Sakr, former head of the Potato Farmers' Syndicate in the Bekaa
- Samer Hayek, a large-scale grape farmer in the Bekaa
- Fawaz Kheir, a large-scale greenhouse farmer in Akkar
- Youssef Atallah, a small-scale organic farmer in South Lebanon

Additionally, LCAT interviewed the owner of the largest agricultural input supplier store in Akkar, Moatassem Sarraj, who provided insights on market demand, access to farming inputs, and drought-related challenges faced by SMEs. Finally, in a bid to capture the effects of drought across the agricultural value chain, LCAT conducted KIIs with four small and medium-sized enterprises (SME) owners who received support under the BASATINE program.[1]

[1] Bolstering Agriculture System's Ability to Invest, Nourish, and Employ (BASATINE) is a four-year (November 2021-April 2025) consortium program with six NGOs including Mercy Corps, CARE (lead), Berytech Foundation, GNFF, LOST, and Al Majmoua. It is aimed at developing a sustainable local food system in the Bekaa and Akkar regions by supporting farmers and actors in the cereals, legumes, and vegetables value chains.

Separately, the team gathered contextual information at the International Center for Agricultural Research in the Dry Areas (ICARDA), although they did not conduct formal KIIs there.

Interviewee	Title
Ihab Jomaa	Head of Irrigation and Agrometeorology and Director of Tal Amara Research Station at the Lebanese Agriculture Research Institute (LARI)
George Sakr	Former head of the Potato Farmers' Syndicate in the Bekaa
Samer Hayek	Large-scale grape farmer in the Bekaa
Fawaz Kheir	Large-scale greenhouse farmer in Akkar
Youssef Atallah	Small-scale organic farmer in South Lebanon
Moatassem Sarraj	Large-scale agricultural supplier in Akkar
Four agri-business SMEs	Beneficiaries of BASATINE program

Table 1: *Individuals interviewed by LCAT*

It should be noted that LCAT received fewer responses than anticipated in some regions, particularly from farmers and public water service providers in the southern districts of South Lebanon and Nabatieh, where Israeli military action has caused extensive agricultural damage and interrupted farming.


Credit: UNDP

Overview: Water Resources and Agricultural Use in Lebanon

Lebanon relies on winter precipitation to recharge its aquifers and feed springs, with 80% to 90% of rainfall concentrated between November and March.[2] The Ministry of Energy and Water estimates that roughly 83% of all water consumed in Lebanon is sourced from springs and groundwater wells, with the remaining 17% drawn from rivers and surface reservoirs.[3] The water distribution network is poorly maintained and lacks the capacity to serve both household and private sector needs; regional utilities are estimated to lose 30% to 50% of flow through leaks and inefficiencies.[4] Alongside this formal grid lies a sprawling informal system; past UNDP surveys cited the use of 55,000 to 60,000 unlicensed private wells alongside 20,537 registered wells (only 2,888 with exploitation permits) and 841 public wells.[5]

The National Water Strategy projected that farms would account for about 62% of national water demand in 2025,[6] with the majority going to Lebanon's fertile Bekaa Valley. Water requirements for crops grown in Lebanon illustrate the scale of demand: potatoes and field tomatoes typically need substantial supplementary irrigation, as do perennial citrus orchards; olives can subsist on rainfall in some Mediterranean zones but require irrigation for high yields; and cereals like wheat generally rely on supplementary irrigation in the Bekaa.[7]

[2] Central Administration of Statistics, Statistical Yearbook Chapter 2 – Morphology, Climatology, Hydrology Vegetation and Environment 2008
[3] Ministry of Energy and Water, Updated National Water Sector Strategy 2020-2035 2022
[4] ibid.
[5] United Nations Development Programme, Assessment of Groundwater Resources of Lebanon January 11, 2016
[6] Ministry of Energy and Water, Updated National Water Sector Strategy 2020-2035 2022
[7] World Bank, Droughts and Agriculture in Lebanon: Causes, Consequences, and Risk Management October 1, 2018;
United Nations Economic and Social Commission for Western Asia Climate resilient agriculture: Translating data to policy actions—Case study of AquaCrop simulation in Lebanon 2020

The 2020 National Water Sector Strategy Update estimated annual irrigation demand at about 842 million cubic meters (MCM): approximately 595 MCM in the Bekaa, 177 in the North, 38 in Mount Lebanon, and 32 in the South.[8] Many farms depend on groundwater sources, while others tap canals linked to the Litani river system when supply permits. Farmers are also increasingly adopting drip irrigation and other water-saving, water retention, and water recycling practices.[9,10]

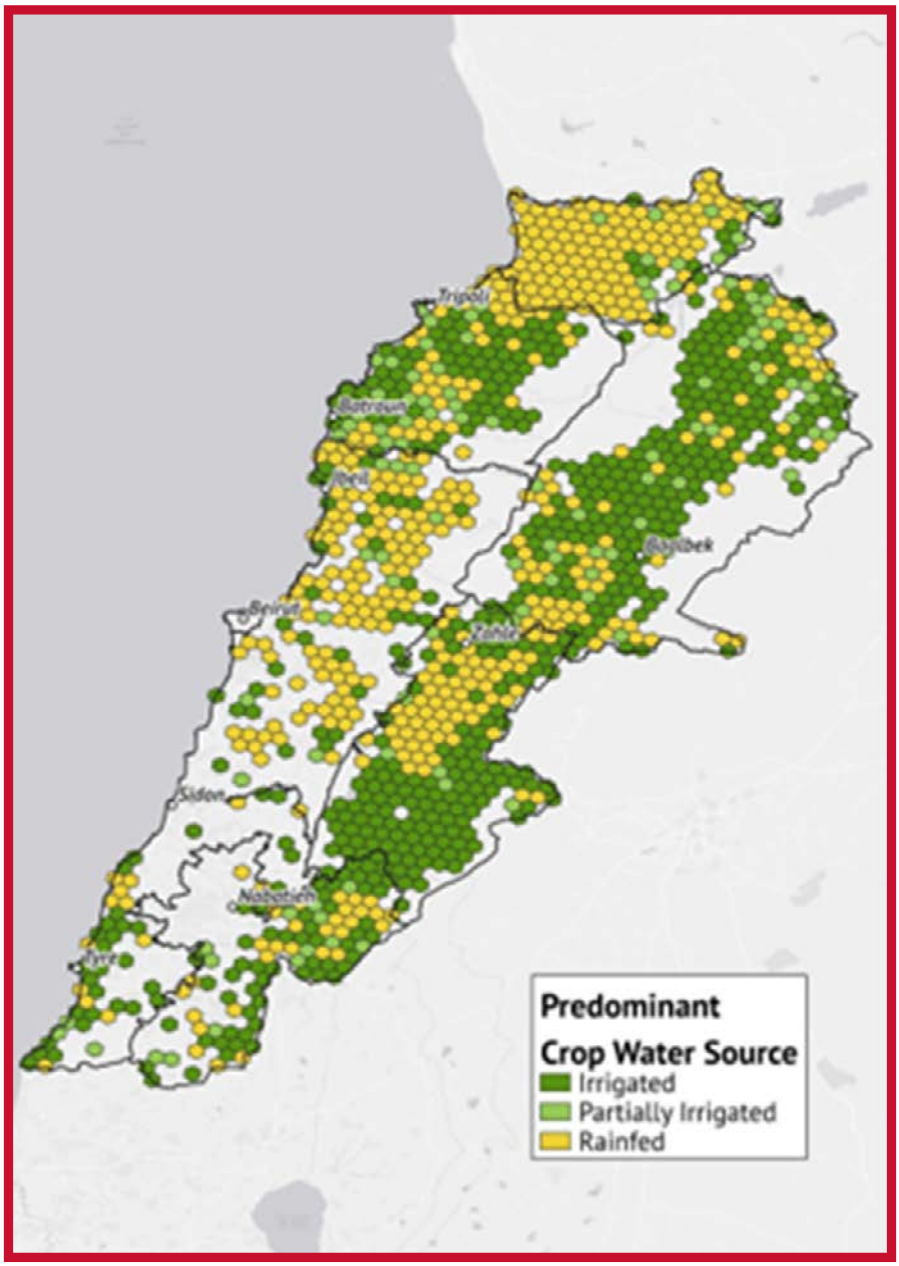

Figure 1: *LCAT estimated the cropland water source by measuring the change in the average Normalized Difference Vegetation Index (NDVI)of cropland during "low" and "normal" rainfall seasons, defined as the bottom 15th percentile and between the 30th and 80th percentile of total seasonal rainfall. Cropland is identified as partially irrigated or irrigated if NDVI values were 10% to 20% greater during "normal" rainfall seasons compared to "low" rainfall seasons. Source: The Sentinel-2 satellite was used to measure NDVI and rainfall data was obtained from WFP.*

[8] Ministry of Energy and Water, Updated National Water Sector Strategy 2020-2035 2022
[9] American University of Beirut, Treated wastewater reuse for irrigation in Bekaa, Lebanon: Quality assessment and public perception 2023
[10] MDPI, Modeling the Hydrological Regime of Litani River Basin in Lebanon for the Period 2009–2019 and Assessment of Climate Change Impacts Under RCP Scenarios September 2025

Consequences and Environmental Impacts of the 2025 Drought

Lebanon entered mid-2025 with a nationwide seasonal rainfall deficit exceeding 50%.[11] According to George Sakr, former head of the Potato Farmers' Union in the Bekaa, total rainfall in the Bekaa was half that of a typical year, falling far below needed volumes to ensure a full harvest.[12,13] This shortfall has forced many farmers to draw on groundwater sources instead of surface water sources such as artificial/natural lakes and streams.[14] As a result, well capacities are overstretched, a phenomenon that not only affects the agriculture sector directly, but also households in the Bekaa, many of which now have more limited access to public water than in the past.[15]

Surface systems are under pressure as well. In northern Lebanon, Nahr el-Bared, a river feeding into an upstream dam, dried up during the summer.[16] Lake Qaraoun, the country's largest surface reservoir, currently holds about 45 MCM, compared with a long-term annual average of nearly 350 MCM.[17,18] This represents the lowest inflow in more than 60 years, tightening downstream deliveries and concentrating pollutants.

[11] Enmaeya, Lebanon Hit by Worst Drought on Record September 1, 2025
[12] George Sakr noted that rain on the Zahle plain "did not exceed [around] 300 mm" this season – barely half of the ≥600 mm typically needed to carry field crops into summer.
KII with Georges Sakr, Former head of the potato farmers union in Bekaa, August 2025
[13] Samer Hayek described the 2025 season as the "worst drought in 17 years," with numerous wells either drying up or yielding far less.
KII with Samer Hayek, Grape farmer in Bekaa, August 2025
[14] Dr. Ihab Jomaa, said that the Bekaa's irrigation mix has shifted to roughly 90% groundwater and 10% surface water, with pumping demand about 1.5× higher than before the recent multi-year dryness.
KII with Dr. Ihab Jomaa, Head of the Department of Irrigation and Agrometeorology at LARI, August 19, 2025
[15] Greenhouse farmer Fawaz Kheir (Akkar) stated that artesian wells that once ran continuously now stop after operating for between 30 minutes and two hours, and some households saw public water provisioning fully suspended.
KII with Fawaz Kheir, greenhouse farmer in Akkar, August 18, 2025
Mercy Crops Lebanon, No Rain, No Gain: Situational Analysis on Drought in Lebanon July 2025
[16] According to Kheir, Nahr El-Bared "dried up completely" this summer, forcing daily rationing at the upstream dam.
KII with Fawaz Kheir, greenhouse farmer in Akkar, August 2025
[17] According to the Litani River National Authority head Sami Alawieh, 2025 was "the driest [year] in at least four decades."
WaSh Sector Lebanon, Water on the Edge: Lebanon's Drought Crisis Demands Immediate International Support July 3, 2025
[18] KII with Samer Hayek, Grape farmer in Bekaa, August 2025

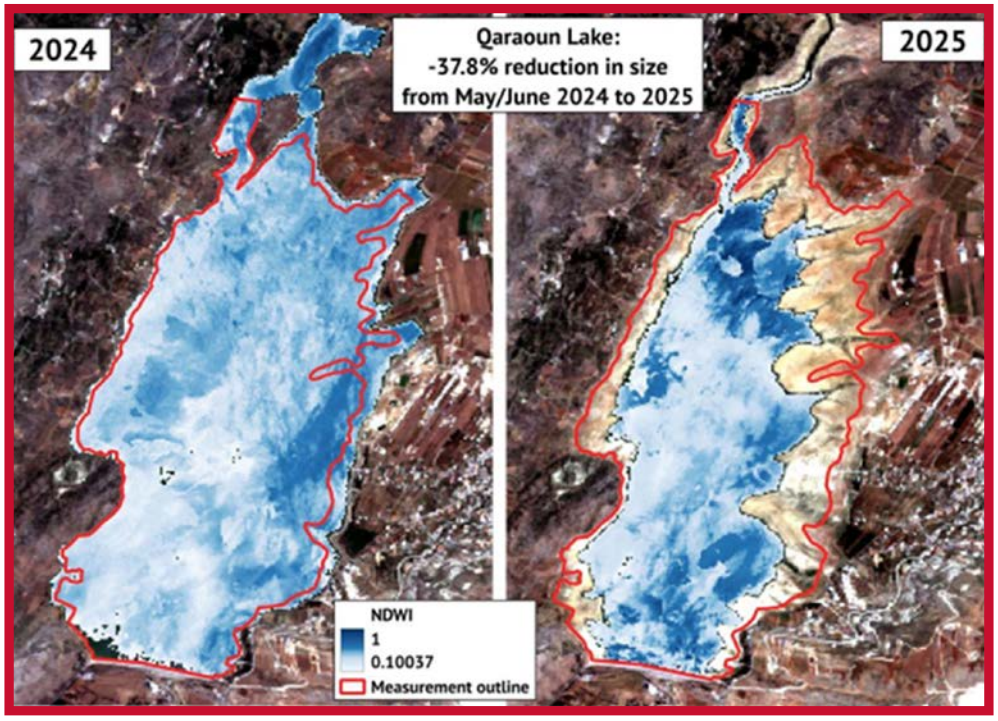

Figure 2: *Surface area of Lake Qaraoun (2024–2025)*
Source: LCAT analysis using Sentinel-2 satellite imagery

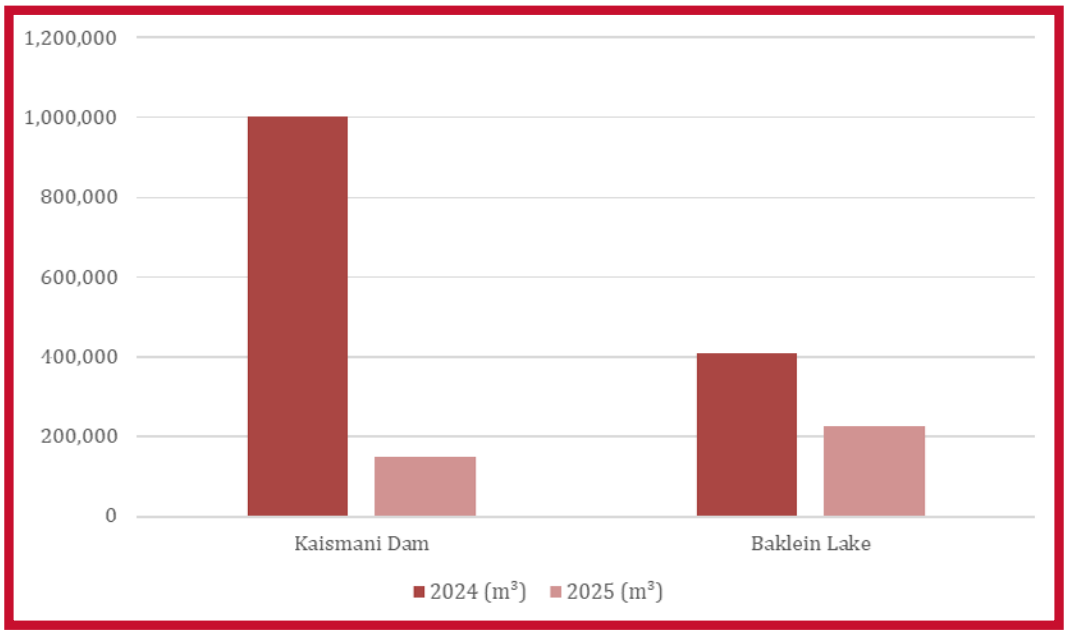

Figure 3: *Reservoir storage, 2024–2025 (in m3)*
Source: WaSh Sector Lebanon, Water on the Edge: Lebanon's Drought Crisis Demands Immediate International Support

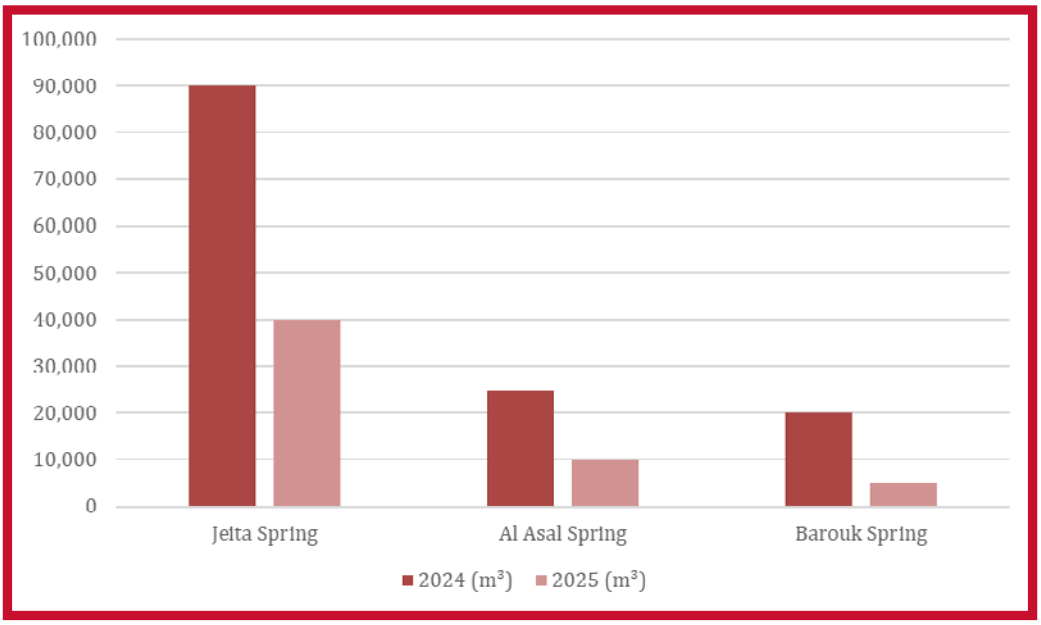

Figure 4: *Daily spring production, 2024–2025 (in m3)*
Source: WaSh Sector Lebanon, Water on the Edge: Lebanon's Drought Crisis Demands Immediate International Support

Overall, multiple drought-affected corridors emerged in 2025 in regions heavily reliant on agriculture with limited alternative surface water supplies.[19] As a result, water rationing began earlier than in previous years. This was due to low rainfall in the past two years, as well as persistently low annual levels starting in 2021.[20,21] However, Lebanon's lack of a formal drought declaration mechanism has hampered a coordinated, nationwide response.

Heavy water use is placing significant strain on aquifers and surface water, in addition to triggering knock-on environmental effects. In the Bekaa and Baalbek-Hermel, a significant share of wells have gone dry,[22] while in Zahle utility companies have warned of the critical depletion of groundwater reserves.[23] In several localities, irrigation canals were repurposed to supply drinking water for tens of thousands of residents.[24]

Mechanical and hydrologic failures due to water stress also forces farmers to run irrigation pumps for shorter periods than they would otherwise, queue for scheduled irrigation time slots, and purchase water from private suppliers. Where the Nahr el-Bared River ran dry, farmers and local observers reported fish kills, an ecological consequence of zero-flow conditions, resembling similar incidents documented in Baalbek.[25]

[19] Kheir said that conditions that "normally begin in October" arrived in July, forcing rationing months earlier than usual, adding that he had sold some 42% of his greenhouses. While Jomaa noted that there is an approximately 11-year dry/wet historical cyclicity (with a major dry year in 2013–2014), he stressed that the absence of any truly wet year since 2021 has prevented meaningful replenishment.
KII with Dr. Ihab Jomaa, Head Department of Irrigation and Agrometeorology at LARI, August 19, 2025
KII with Fawaz Kheir, greenhouse farmer in Akkar, August 18, 2025
[20] Mercy Corps Lebanon, No Rain, No Gain: Situational Analysis on Drought in Lebanon July 8, 2025
[21] World Bank, Droughts and Agriculture in Lebanon: Causes, Consequences, and Risk Management October 1, 2018
[22] Lebanon Response Plan, 2025 Water Scarcity and Drought Preparedness & Response September 9, 2025
[23] L'Orient Today, Joe Saddi in Zahle: State authority also means ending water and electricity violations October 11, 2025
[24] Mercy Corps Lebanon, Household Water Access in Baalbek-Hermel and Bekaa: Constraints and Coping Mechanisms October 3, 2025
[25] KII with Fawaz Kheir, greenhouse farmer in Akkar, August 18, 2025
Megaphone, @MegaphoneNewsEN June 17, 2025

The drought has also compromised soil and agro-ecosystems. When rainfall is low, salts – whether present in irrigation water or added in later – accumulate in the soil instead of leaching. This raises the soil's salinity and sodicity under dry, high-evaporation conditions. Elevated electrical conductivity/sodium absorption ratio[26] reduces water infiltration and permeability, disperses soil clays, causes surface crusting, and ultimately cuts root-zone water availability,[27] even when water is applied. Sensitive tree crops (e.g., citrus, deciduous fruit, and grapes) are prone to specific-ion toxicities (chloride, sodium, and boron) that manifest as leaf burn, defoliation, and yield loss – symptoms that drought can accelerate.[28]

Coastal aquifers face a different hazard: an increased risk of saline intrusion as groundwater levels drop and pumping intensifies. When groundwater levels fall near or below sea level due to excessive pumping, seawater pushes inland or up into wells. The result is brackish irrigation water that cuts yields, salts soils, corrodes equipment, and forces costly repairs.[29]

Ecological and secondary effects widen the circle of impact. Lower water levels at key dams reduce environmental flows[30] and higher pumping/trucking needs raise fuel use and costs for farms,[31] tightening margins and reinforcing unsustainable extraction cycles. Prolonged dryness increases the risk of wildfires,[32] an annual phenomenon that typically begins between June and October and grows in frequency in August and September.[33] This period can be prolonged, however, by low ground-level humidity, evapotranspiration, and plant mortality.[34]

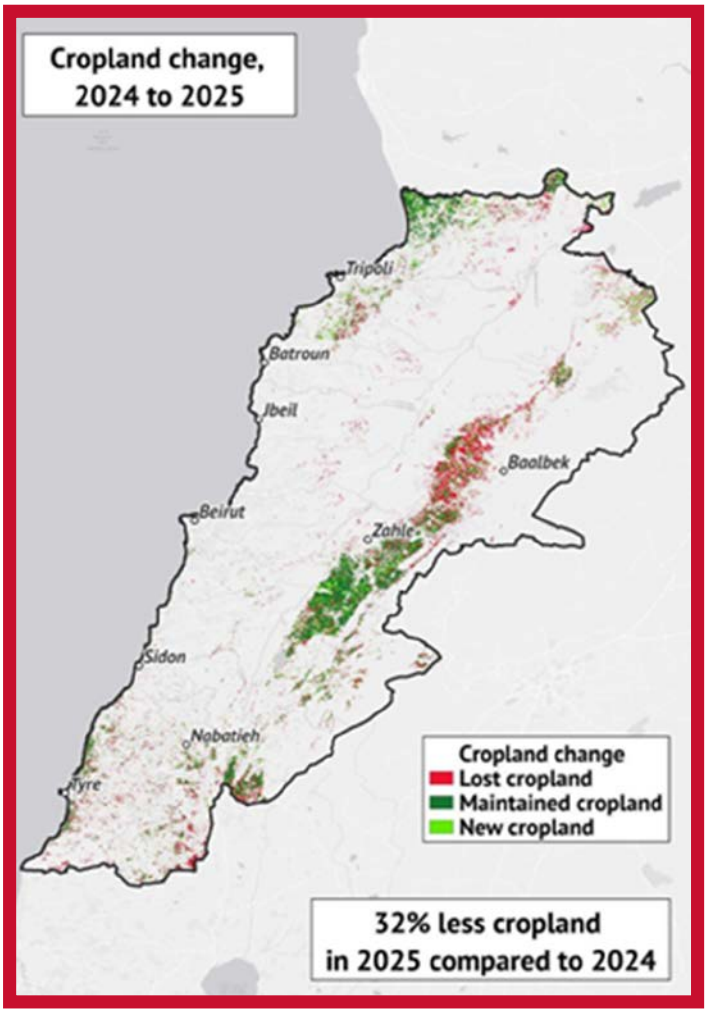

Figure 5: *Changes in cropland (2024–2025)*
Source: LCAT analysis using Sentinel-2 satellite imagery

[26] Electrical conductivity of soil is used as an indicator of salinity levels and risks of damage to soil.
The Sodium Adsorption Ratio is a measure of the proportion of sodium (Na^+) relative to calcium (Ca^{2+}) and magnesium (Mg^{2+}) in water.
[27] Root-zone water is the accessible water reservoir where roots are concentrated.
Romano N. et al.,Root-Zone Water-Storage Capacity and Uncertainty: An Intrinsic Factor Affecting Agroecosystem Resilience to Drought, 4 January 2025
[28] Food and Agriculture Organization, Coping with water scarcity: An action framework for agriculture and food security August 27, 2012;
AUB Treated wastewater reuse for irrigation in Bekaa, Lebanon: Quality assessment and public perception 2023
[29] Mark Saade, Deterioration of Groundwater in Beirut Due to Seawater Intrusion January 2017
[30] Arab News, Lebanon's worst drought on record drains largest reservoir July 15, 2025
[31] Al Safa, Lebanon's Agricultural Catastrophe: Drought Threatens Food Security May 7, 2025
[32] L'Orient Today, Qaraoun Lake reaches its lowest level ever recorded July 16, 2025
[33] National Early Warning System Platform, Fires
[34] Fire MDPI, Fire Regime Analysis in Lebanon (2001–2020): Combining Remote Sensing Data in a Scarcely Documented Area 2022

In 2025, several fires erupted in November, including in Akkar, Iqlim al-Kharoub, and Jezzine. Notably, Israeli airstrikes ignited blazes in the Iqlim al-Tuffah forests in Nabatieh, consuming vast areas of pine and olive trees.[35] According to the National Council for Scientific Research, 7,147 fires were recorded across Lebanon between January and November 10, 2025, including 6,900 grassland fires and 637 affecting fruit trees and forests.[36]

Governorate	Total Number of Fires	In Forests	In Fertile Land
Akkar	213	161	52
Mount Lebanon	200	155	45
South Lebanon	200	130	70
Nabatieh	147	102	45
Baalbek-Hermel	37	20	17

Table 2: *Fires by Lebanese governorate in 2025*
Source: National Early Warning Platform / Al-Akhbar

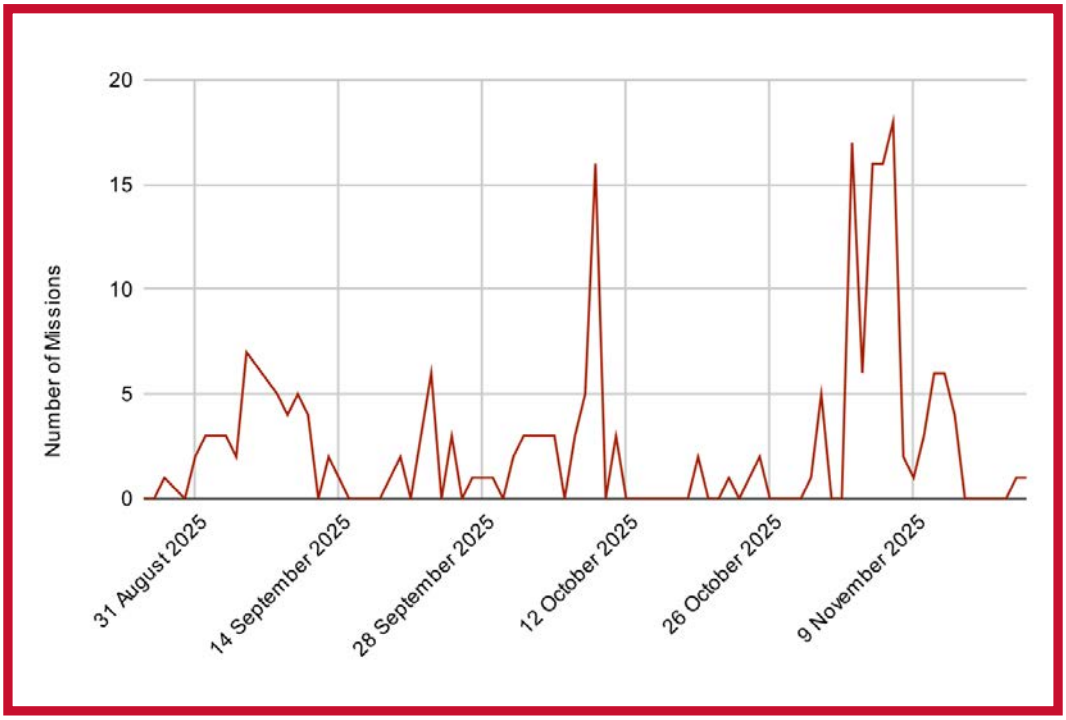

Figure 6: *Number of daily Civil Defense firefighting missions in fertile and agricultural lands.*
LCAT receives daily reports from the Directory of Civil Defense of all missions conducted within a 24-hour timeframe. LCAT consolidated the reports and aggregated information on firefighting missions in fertile or cultivated lands. Drought, among other factors, is correlated to an increase in fires well beyond the usual season, namely through late October/early November.

[35] Kataeb, الحرائق تلتهم أحراج لبنان... إبادة بيئية وإهمال وقدرات محدودة November 12, 2025
[36] National Council for Scientific Research head Dr. Shadi Abdullah noted that the delayed onset of rainfall has prolonged this year's fire season beyond its usual September-October peak. Over 90% of the fires were attributed to human causes, with dry and windy conditions accelerating their spread.
Al-Akhbar, يفعل الجفاف والعدو الإسرائيلي... موسم الحرائق يتمدد November 12, 2025;
Over the past two years, Israeli shelling has resulted in the burning of 8,566 hectares of land, including 3,922 hectares of fertile land, 2,587 hectares of forests and woodlands, and 2,057 hectares of grasslands. Some 600 hectares of forests and fertile land have been burned by wildfires, including about 150 hectares in Akkar, the highest among all governorates due to its dry climate and elevated temperatures.
Al-Akhbar, يفعل الجفاف والعدو الإسرائيلي... موسم الحرائق يتمدد November 12, 2025;
Annahar, حريقا في لبنان منذ بداية 2025... وزيرة البيئة تعلق وخبير يرد: شبعنا كلاما 7147 November 11, 2025

Farmer Coping Mechanisms and Adaptations

Across Lebanon, farmers have shifted from emergency coping to adaptation.[37] The most notable change is in irrigation practices. For example, many greenhouse producers in coastal areas have transitioned to drip irrigation.[38,39] A subset of growers are adopting smart irrigation tools that use scheduling and sensor kits, though most smallholders[40] still need technical support to use them effectively.[41,42]

Some farmers are turning to soil-moisture conservation by using black plastic mulch, soil water retention gels, and drip kits; inputs that reduce evaporation and water demand during drought. However, these methods can be expensive, preventing widespread adoption among greenhouse vegetable growers.[43] Where financing is available, NGOs have helped farms adapt their methods.[44] Bekaa growers have combined private wells with on-farm reservoirs and, when necessary, purchased water from private suppliers. Some, however, were unable to do so, with many electing to under-irrigate, a method that keeps plants alive but reduces yields.[45]

[37] World Bank, Droughts and Agriculture in Lebanon: Causes, Consequences, and Risk Management October 1, 2018
[38] KII with Fawaz Kheir, greenhouse farmer in Akkar, August 18, 2025
[39] Water Practice and Technology, Growers' irrigation practices, knowledge, trust, and attitudes toward wastewater reuse in Lebanon, Jordan, and Tunisia through a food safety lens October 19, 2023;
[40] Smallholders are rural producers managing limited land and resources, often operating with restricted access to capital, while adapting livelihoods systems to changing environmental, economic, and political conditions.
World Atlas of Desertification, Global Patterns - Smallholder Agriculture
[41] KII with Dr. Ihab Jomaa, Head Department of Irrigation and Agrometeorology at LARI, August 19, 2025
[42] Water Practice and Technology, Growers' irrigation practices, knowledge, trust, and attitudes toward wastewater reuse in Lebanon, Jordan, and Tunisia through a food safety lens October 19, 2023;
Food and Agriculture Organization, Coping with water scarcity: An action framework for agriculture and food security August 27, 2012
[43] "Alternatives for drought mitigation (soil gels, black mulch) are too expensive."
KII with Fawaz Kheir, greenhouse farmer in Akkar, August 18, 2025
[44] Lebanon Response Plan, 2025 Mid-Year Sector Dashboard
[45] The Instagram account of the bio-intensive farm @terrefertile961 reported the discontinuation of water-intensive crops.
Instagram, Terrefertile961 account

As noted by Ihab Jomaa, Head of Irrigation and Agrometeorology at the Lebanese Agriculture Research Institute (LARI), farmers are adapting to these constraints by harvesting rainwater where feasible (farm ponds/micro-catchments) and adjusting scheduling and crop choices.[46]

A lesser used but still important adaptation involves reusing treated wastewater (TWW). In Ablah, Bekaa, a minority of farmers already complement groundwater/river sources with TWW where available, and surveys show high willingness among farmers to use safe TWW, as it can lower overhead and operational costs while maintaining yields – assuming proper management, namely observance of filtration and hygiene protocols.[47]

High energy costs have also forced farmers to adapt. As diesel prices have increased, some farmers have installed solar-powered pumps to reduce operating costs and maintain minimal irrigation during peak scarcity,[48] while others have reduced the size of planted areas,[49] skipped water-intensive cycles,[50] or left land fallow to limit exposure in dry years.

Some adaptation methods remain too costly or are hindered by weak support systems. For example, Kheir's case illustrates that awareness of options such as gels and mulches does not lead to adoption when profit margins are limited. By contrast, low-cost and labor-intensive measures are becoming more common, as demonstrated by Terre Fertile, which publicly documented the use of shade nets, replacing water-intensive crops, raising seedlings in nurseries instead of direct seeding, and applying mulch.[51]

[46] KII with Dr. Ihab Jomaa, Head Department of Irrigation and Agrometeorology at LARI, August 19, 2025;
Food and Agriculture Organization, Coping with water scarcity: An action framework for agriculture and food security August 27, 2012
[47] AUB, Treated wastewater reuse for irrigation in Bekaa, Lebanon: Quality assessment and public perception 2023
[48] Xinhua, Adapting to extremes -- Lebanon's farmers battle heat and drought September 15, 2025
[49] Al Akhbar, Lebanon's Drought Triggers Infrastructure Collapse September 7, 2025
[50] NowLebanon, The Next Disaster: Lebanon's Water Crisis Reaches Breaking Point July 24, 2025
[51] The Instagram account of the bio-intensive farm Terre Fertile reported employing various adaptation measures, including the installation of shading nets, the discontinuation of water-intensive crops, the use of nurseries in place of direct seeding to reduce production costs, and the application of mulch.
Terre Fertile via Instagram, @terrefertile961 February 23, 2025


Credit: FPF

Zooming in: Impact of the 2025 drought on agriculture

Bekaa crops (grapes, potatoes, and wheat):

According to Samer Hayek, an agricultural engineer and one of the largest grape farmers in the Bekaa, the 2025 drought was the worst in 17 years. He reported that well capacity has significantly dropped – in some cases drying up – and that roughly 50% of the harvest was of medium or low quality. Much of it was dumped or diverted to wineries, and entire blocks (notably vineyards growing the Red Globe[52] variety) were uprooted. His own ledger shows 35,000 US dollars (USD) in revenue versus USD 21,000 in costs, a thin margin. Hayek noted that he often irrigated "just enough to keep trees alive," sometimes sourcing water from the Litani river system despite pollution concerns.[53]

Coastal crops (greenhouses, citrus trees):

In Akkar, many farmers sold their greenhouses after the drought arrived early and water rationing came into effect.[54] One agricultural input supplier said that watering frequencies and fuel costs jumped this season, with most farms using drip irrigation and sprinklers, and roughly 70% of coastal growers relying on wells. Farmers in some areas used sewage water mixed with water from Nahr el-Bared and local streams – raising water quality risks and, in the process, increasing the number of thrips, whiteflies, and mites at growing sites.[55]

[52] "Red Globe" is a large, round, red-seeded grape known for its plump, crunchy texture, juicy flesh, and mild sweetness. Good Fruit Guide, Red Globe - Good Fruit Guide
[53] KII with Samer Hayek, Grape farmer in Bekaa, August 2025
[54] KII with Dr. Ihab Jomaa, Head Department of Irrigation and Agrometeorology at LARI, August 19, 2025; KII with Fawaz Kheir, greenhouse farmer in Akkar, August 18, 2025
[55] Sarraj notes that peanuts that once required 10 rounds of irrigation per year now need around 15. KII with Moatassem Sarraj, Leading Input supply store owner, August 27, 2025

Beyond Akkar, water stress in Lebanon's main citrus-producing region will have a direct effect on yields. Chronic over-pumping of coastal aquifers drives saltwater intrusion, which limits citrus production and cuts yields.[56]

Small organic farmers:

Youssef Atallah, an organic farmer in Kawkaba, South Lebanon, said "my reservoirs are empty, my crops are dying, and I missed my eggplant season," highlighting the toll that drought takes on the summer cash cycle for smallholder agricultural operations.[57] Farmers are facing high irrigation costs due to drought, forcing them to purchase expensive trucked water to sustain relatively small plots of land. This offers an example of how increased private water provisioning eats into working capital and raises unit costs for producers already facing high water access costs during droughts.[58]

Figure 7: *Youssef Atallah's empty reservoir in Kawkaba, South Lebanon*

[56] World Bank, Droughts and Agriculture in Lebanon: Causes, Consequences, and Risk Management October 1, 2018
[57] During a visit to his land, Youssef Atallah reported that his 18,000 m^3 reservoir had dried up, and that he can no longer pump water from his well.
KII with Youssef Atallah, organic farmer in South Lebanon, August 23, 2025
[58] In a LinkedIn post, Jean Charles Khairallah said "This time it will be the drought affecting Lebanon.
This year's rainfall is only one-third of the average rainfall in Lebanon. This situation has a direct impact on my pocket as a farmer with 3,000 square meters of land. I am 62 years old and, for the first time, I had to buy three 20,000-liter tanks for a total price of USD 300, and counting."
Jean Charles Khairallah via LinkedIn, Back to URBAN FARMERS MARKETS September 13, 2025


Credit: UNICEF

Government and NGO action

On July 18, the Ministry of Energy and Water (MoEW) launched a public awareness campaign to promote sound water management.[59] Concurrently, the state activated an inter-ministerial drought coordination mechanism to align sectors on preparedness, mapping, and monitoring (wells, water prices, and social tensions). Beginning on June 3, 2025, public water providers moved to stricter water rationing as levels in reservoirs decreased. The Beirut and Mount Lebanon Water Establishment warned that shortages would be felt by September, and the North Lebanon Water Establishment and Bekaa Water Establishment announced a reduction in the frequency of public water supply in June.[60] Sector partners in the WASH and Food Security and Agriculture sectors adjusted programming and assembled a joint 2025 drought response. About USD 100 million is needed for this process: USD 42 million for life-saving WASH (emergency water, basic services, resilience) initiatives and USD 59 million for food security and agriculture (inputs, climate-smart support). Only part of this appeal is currently funded.[61] On the ground, NGOs have provided or assisted farmers in acquiring inputs such as fertilizers, seeds, greenhouses, plastic covers, and drip systems to reduce evapotranspiration and water use per unit output. NGOs have also supported preparedness measures including drought-vulnerability mapping, early-warning reinforcement, and field monitoring of wells and water prices.[62]

The International Center for Agricultural Research in the Dry Areas (ICARDA) has launched several initiatives focusing on drought mitigation and sustainable water management in agriculture. ICARDA's country program in Lebanon emphasizes developing climate-resilient crops, with local research stations testing and screening key crop varieties for tolerance to drought and heat stresses.

[59] This Is Beirut, Lebanon Launches National Campaign to Combat Water Shortage July 18, 2025
[60] Arab News, Water shortages plague Beirut as low rainfall compounds woes August 14, 2025;
Bekaa Water Establishment, بيان صادر عن مؤسسة مياه البقاع September 17, 2025;
National News Agency, مياه لبنان الشمالي تعلن اتباع برامج تقنين June 3, 2025
[61] Wash Sector Lebanon, Water on the Edge: Lebanon's Drought Crisis Demands Immediate International Support July 3, 2025
[62] ibid.

In parallel, ICARDA has led regional projects to improve water-use efficiency and livelihoods: for example, the USAID-funded Water and Livelihoods Initiative (2009–2018) addressed critical water and land management challenges across several countries, including Lebanon.[63]

Figure 8: *"Our water is our life, let us preserve it" awareness billboard on North Lebanon highway*

Interviewed farmers described the drought response as NGO-led with little direct government support, rendering many dependent on NGO support to maintain production. Humanitarian partners warn that existing funding is insufficient and that without rapid financing to develop water infrastructure, there is an acute risk of service collapse amid potentially prolonged aquifer and reservoir depletion.[64]

[63] ICARDA, Lebanon (Country Overview)
[64] WaSh Sector Lebanon, Water on the Edge: Lebanon's Drought Crisis Demands Immediate International Support July 3, 2025

Conclusion and Recommendations

Lebanon is entering its rainy season but there are several lessons to be learned from the 2025 drought, ones that will likely prove valuable in the coming years should drought conditions persist. In the immediate term, the Lebanese government and other key stakeholders should focus on stabilizing water access, especially for agricultural production, and ensure that measures are put in place to address WASH and food security challenges, both key elements of the 2025 drought response. To this end, work should focus on rehabilitating wells, repairing canals, regulating water trucking, and initiating real-time monitoring in drought hotspots.[65] In the agriculture sector specifically, rapid support is needed for drought-resilient inputs, cash and food aid for farmers, and fodder for affected regions like the Bekaa and South/Nabatieh.

In the near to medium term, mitigation strategies must shift toward long-term resilience. This includes reducing reliance on diesel by offering co-financing for solar-powered pumps, expanding safe wastewater reuse for irrigation, and promoting smart irrigation tools.[66] Structural fixes like reducing water losses in utilities and planning decentralized storage (e.g., rainwater harvesting, farm ponds) are critical.[67] Institutional reforms such as a formal drought declaration system and basin-level water governance, especially in high-impact areas like the Litani river, are also needed.[68,69] By the next dry season, success would be marked by more efficient water use, reduced diesel reliance, regulated water abstraction, and safe reuse of treated wastewater – all backed by evidence and practical implementation pathways.

[65] Lebanon Response Plan, Water Scarcity and Drought 2025 At a Glance September 9, 2025
[66] ibid.
[67] "An effective drought response involves rainwater harvesting, better demand management, stronger LARI/DIAM capacity, regulated groundwater use, and farmer-focused projects to boost water efficiency and resilience."
KII with Dr. Ihab Jomaa, Head Department of Irrigation and Agrometeorology at LARI, August 19, 2025
[68] United Nations Economic and Social Commission for Western Asia, Climate resilient agriculture: Translating data to policy actions—Case study of AquaCrop simulation in Lebanon 2021
[69] World Bank, Droughts and Agriculture in Lebanon: Causes, Consequences, and Risk Management October 1, 2018

Additional recommendations to achieve the goals mentioned above include:

- Reactivating and upgrading the National Early Warning System Platform[70] to help forecast droughts and inform emergency notifications.
- Imposing strict rationing measures, such as water metering and ground water conservation, to counter overuse of running water streams and avoid saltwater intrusion caused by excessive groundwater extraction.[71]
- Promoting efficient crop selection and breeding through encouraging farmers' transition to adopt drought-tolerant and less water-intensive crops. Such measures should be supported by research findings to ensure successful transition and adaptability.[72]
- Funding and supporting the adoption of climate-adaptive cultivation techniques, such as shade nets to reduce evapotranspiration and the application of mulch (organic or plastic) to retain soil moisture.
- Similarly, funding and promoting the adoption of soil water retention gels, black plastic mulch, and drip irrigation kits that aid in soil moisture conservation.
- Training smallholders in modern irrigation techniques and tools such as drip irrigation, water scheduling, and crop-based irrigation planning to improve irrigation efficiency and management throughout the crop cycle.
- Advocating and promoting the reuse of treated wastewater by facilitating safe and regulated methods of treatment in tandem with farmer training on health and environmental safeguards.
- Funding and advocating for the use of solar-powered wells and pumping systems to reduce operational costs and attain reliable water supply during periods of peak scarcity, while minimizing dependence on grid electricity.
- Funding and promoting rain harvesting techniques to increase reliance on surface water which can protect groundwater resources and prevent contamination.

[70] NEWSP, Droughts - National Early Warning System Platform (NEWSP)
[71] Scientific Research Publishing, Lebanon's Water Resources Salinity Crisis December, 2024
[72] PubMed Central, A Dual Strategy of Breeding for Drought Tolerance and Introducing Drought-Tolerant, Underutilized Crops into Production Systems to Enhance Their Resilience to Water Deficiency September 24, 2020

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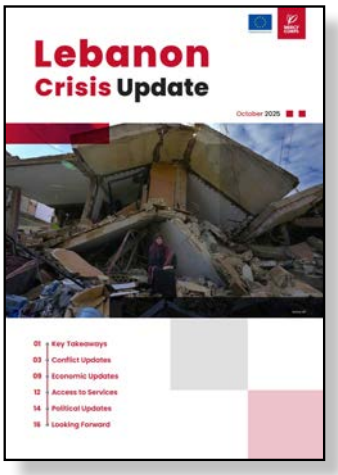

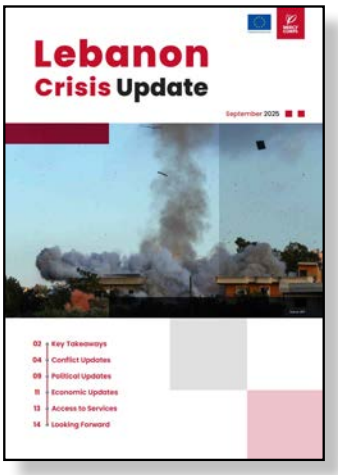

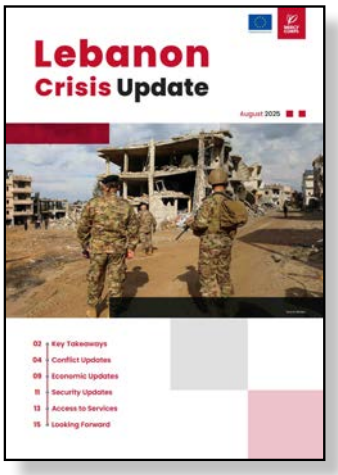

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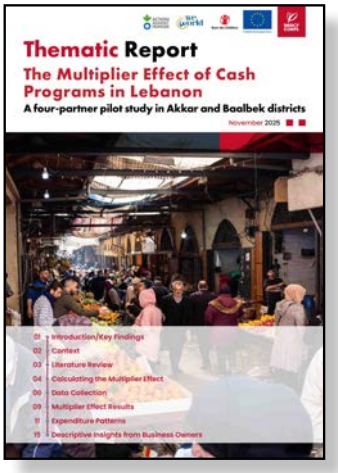

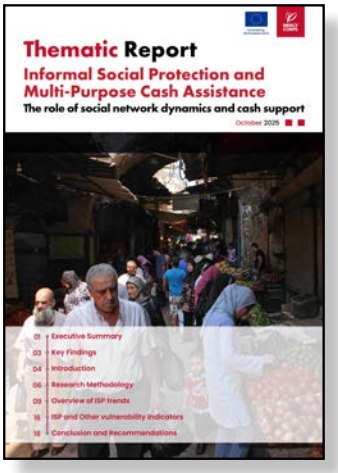

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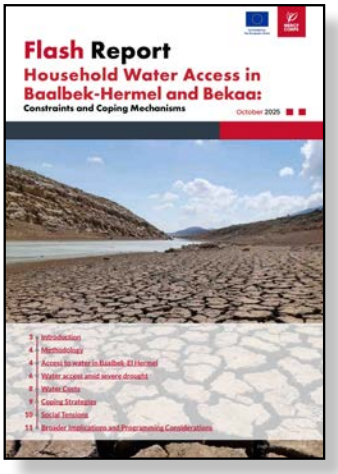

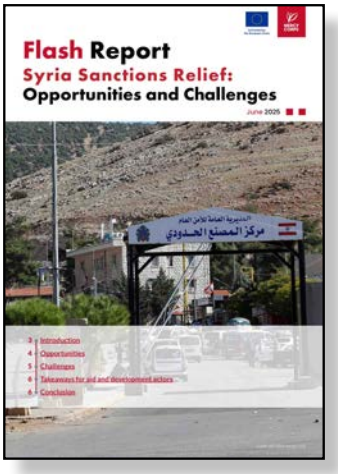

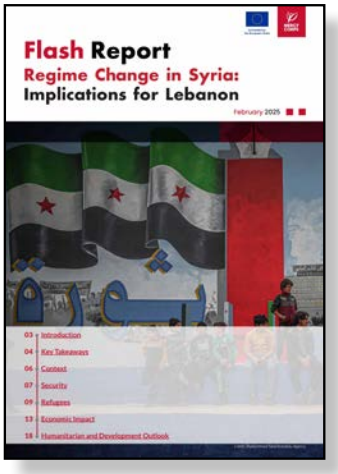

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MERCY CORPS

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