Rebuilding agriculture in Gaza: Experiences and perspectives

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Abstract

The agricultural sector in the Gaza Strip - once a cornerstone of local food security, livelihoods, and economic stability - has suffered unprecedented destruction since the outbreak of the 2023 conflict. Satellite assessments by FAO and UNOSAT indicate that more than 80% of cultivable land and a majority of agricultural infrastructure, including greenhouses and irrigation wells, have been severely damaged. Livestock and fisheries have experienced drastic losses, profoundly affecting rural livelihoods and food availability.

This paper analyses the extent of damage to land, infrastructure, and production systems, highlights key socio-economic and environmental impacts, and reviews estimated losses exceeding USD 2 billion. Despite a recent ceasefire, major constraints persist, including limited access to land, widespread debris, compromised water systems, and underfunded recovery appeals.

A two-phase recovery strategy is proposed: an emergency response focused on stabilising livelihoods and restoring minimal production capacity, followed by a transition toward sustainable, resilient agriculture through household-

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level production, water-efficient technologies, capacity building, and revitalisation of cooperatives.
The findings underscore the need for coordinated international support and locally driven solutions to rebuild Gaza's agro-food system and restore the foundations for long-term resilience.

Keywords

Agricultural reconstruction, Food security, Water-efficient technologies

Introduction

Before the conflict, agriculture represented a fundamental pillar for food security, livelihoods, and the economy of the Gaza Strip.

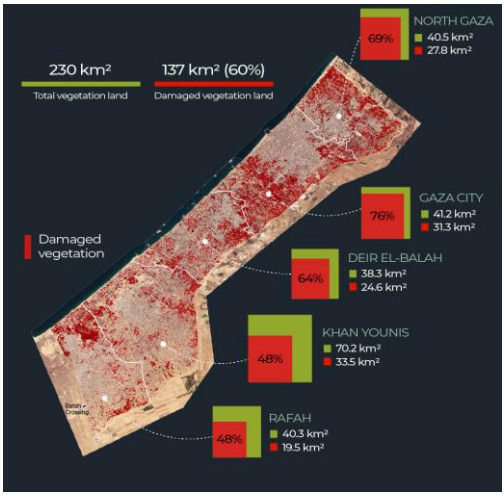

Figure 1 – Damages on agriculture (Al Jazeera 2024)

With the conflict that began in October 2023, the local agricultural sector has been severely affected: the scale of damage to land, agricultural infrastructure, livestock, and livelihoods makes an in-depth analysis and a recovery strategy urgently needed.
This paper aims to document the losses, analyse the socio-economic and environmental impact, and propose an action plan for a gradual and sustainable recovery.

Impact analysis: Scale of destruction

Damage to soil and agricultural infrastructure

A recent satellite-based assessment by FAO and UNOSAT estimates that, as of April 2025, more than 80% of Gaza's cultivable land has been damaged, amounting to 12,537 hectares out of a total 15,053, while only about 4.6%, equivalent to 688 hectares (FAO 2025a), remains available for cultivation. Damage to greenhouses is similarly severe, with approximately 71.2% reported as destroyed. The condition of agricultural wells, which are essential for irrigation, is also critical: the latest figures indicate that around 82.8% of irrigation wells are no longer functional.
Further updates from 2025 confirm that the situation has continued to deteriorate. An October assessment reports that damage to cultivable land has reached 87% (FAO 2025b), with greenhouse and well destruction following the same trend.
Taken together, these data demonstrate a drastic reduction in usable agricultural land, severely compromising local production capacity and overall self-sufficiency.

Damage to livestock and fisheries

Before the conflict, agricultural, livestock, and fish production provided livelihoods for an estimated 560,000 people. Current FAO assessments describe extremely severe losses in the livestock sector, with cattle numbers falling by approximately 96% and poultry (FAO 2025c) reduced to only about 1% of pre-conflict levels. The fisheries sector has also experienced an almost complete collapse. These losses extend far beyond production capacity: they directly affect food availability, household income, and the overall resilience of rural communities.

Socio-Economic and environmental impacts

The destruction of agricultural and livestock infrastructure has destabilised the livelihoods of hundreds of thousands of people, in a context where agriculture previously accounted for roughly 10% of Gaza's economy. Damage to water infrastructure has further intensified an already critical water crisis, severely limiting irrigation and obstructing both food security and the recovery of agricultural activities. In addition, soil degradation and contamination - stemming from bombardment, debris, potential explosive remnants, and the prolonged deterioration of water networks - pose long-term threats to soil fertility and have rendered many areas uncultivable. Recent satellite analyses continue to document a progressive decline in land quality, confirming the scale and persistence of the devastation.

Economic assessment of losses

According to FAO/UNOSAT data, losses in Gaza's agricultural sector amount to over USD 2 billion (direct damages + derived losses: about USD 835 million in damages and USD 1.3 billion in losses), while reconstruction and rehabilitation needs are estimated at around USD 4.2 billion.

These figures confirm the scale indicated in the initial document, although some figures (e.g., extreme livestock or poultry losses) are more cautiously presented in official sources compared to the original text. For instance, although FAO reports drastic losses, precise percentages such as "99% poultry loss" are not uniformly confirmed across all reports, reflecting the difficulty of obtaining accurate estimates in a rapidly evolving conflict context.

Obstacles to recovery and limitations

The current context presents deep obstacles to any meaningful recovery. Large portions of the territory remain inaccessible due to security concerns (FAO 2025b), debris, unexploded ordnance, and structural hazards; even under the recent ceasefire, only a limited share of damaged land can actually be rehabilitated. Water infrastructure is critically impaired, with most agricultural wells no longer functioning, a situation that severely restricts irrigation and makes immediate water-related interventions indispensable. The social and economic landscape has also been deeply disrupted, as the loss of livelihoods, population displacement, the breakdown of agricultural value chains, and the scarcity of essential inputs such as seeds, tools, and fertilizers continue to undermine both production and resilience. At the same time, a substantial gap persists

between needs and available resources: FAO's appeals for reconstruction remain underfunded, while the magnitude of the destruction far exceeds current operational capacities.

Proposed recovery strategy: A two-phase model

In light of the scale of the crisis and the evident constraints, a gradual strategy is proposed in two phases model.

- *Phase 1 – Emergency (0–3 months)*

The objective of this phase is to stabilise livelihoods and lay the groundwork for agricultural recovery. Key actions include the distribution of basic agricultural kits, comprising seeds, manual tools, and micro-irrigation systems, to enable small-scale subsistence farming. Urgent measures are also required to restore water infrastructure, including reactivating wells, repairing existing networks, and potentially installing rainwater harvesting systems or small pumping units. Support for livestock and fisheries is essential, involving the provision of work animals where feasible and fishing kits, such as small boats and nets, to reactivate complementary livelihood activities. Finally, cultivable areas must be cleared through debris removal, identification and disposal of unexploded ordnance, and preparation of safe land for productive agricultural use

- *Phase 2 – Transition and sustainable reconstruction (beyond 3 months)*

The objective of this phase is to rebuild a resilient and sustainable agricultural system capable of adapting to water scarcity and infrastructure challenges. Strategic actions include promoting small-scale family farming and home gardening with short-cycle crops and high-yield vegetables to ensure both food security and income for households. Resilient and water-efficient techniques are to be adopted, such as micro-irrigation, rainwater harvesting and storage,

the potential use of soilless or hydroponic systems, and cultivation of drought-resistant crops. Training and capacity-building programmes will be implemented to strengthen sustainable agricultural practices, including composting, crop associations, and efficient resource management. Agricultural cooperatives and community networks will be revitalised to facilitate resource sharing, improve market access, and enable collective management of reconstruction efforts. Finally, the fisheries and livestock sectors will be gradually restored through the rebuilding of minor infrastructure, small ports, and landing sites, alongside the promotion of sustainable fishing practices.

Conclusions and recommendations

The destruction of Gaza's agro-food system is extensive, with the loss of cultivable land, agricultural infrastructure, water systems, and livestock rendering short-term food self-sufficiency nearly impossible. An effective response must combine immediate emergency interventions with a long-term strategy focused on sustainable and resilient reconstruction. The proposed two-phase model addresses current needs and aligns with international cooperation frameworks. Promoting local capacities, cooperative structures, community engagement, technical training, and agricultural practices tailored to the new water and infrastructure constraints is essential. In addition, international mobilisation is critical to secure adequate funding, ensure transparency, and provide effective monitoring and coordination with both local and global actors.

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