



## Sector 5 Irrigation System Rehabilitation

Building resilience for smallholder farmers in Deir-ez-Zor Governorate

End of Activity Review

Syria Country Office - April 2022



World Food Programme

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# EXECUTIVE SUMMARY

Agriculture has been the main source of income for most of the population in the Deir-ez-Zor Governorate, Syria's second largest Governorate. With an annual rainfall less than 150 mm/year, the Euphrates River has historically provided the main source of water supply for the land, the livestock, and the people in Deir-ez-Zor. During the crisis, the irrigation systems from the Euphrates were severely damaged in Deir-ez-Zor. To cope, farmers relied on underground water to irrigate their fields, which increased the soil salinity resulting in reduced agriculture production. Additionally, many households in the area reported inadequate food consumption due to lasting impacts of the crisis, which included destruction of public infrastructure, economic recession, loss of lives and properties, and outmigration, particularly of youth.<sup>1</sup>

In 2019, WFP conducted a Seasonal Livelihood Programming (SLP) in Al-Mayadeen District.<sup>2</sup> The rehabilitation of the irrigation system of Sector 5 was one of the top priorities identified through the SLP. Located to the south-east of Deir-ez-Zor City in Al-Mayadeen, this irrigation system serves the villages of Mahkan, Quriyeh, Swedan Shameh and Gharibeh. The villages have up to 5,200 hectares (ha) of cultivatable land of which 3,565 ha are irrigated by the Sector 5 scheme. The project was implemented in collaboration with the Food and Agriculture Organization (FAO) and included technical inputs from the Ministry of Agriculture and Agrarian Reform (MAAR) and the Ministry of Water Resources (MoWR), and with direct involvement of the local community. The rehabilitation was completed in December 2020 with a total cost of USD 2.83 million. WFP and FAO invested in conducting technical assessments, rehabilitating the pumping and lifting stations, and building the capacity of local partners and communities on issues related to the maintenance of the canals to ensure the continuity and longevity of the investment, including the creation of four water user associations and 143 subgroups responsible for the field canals.

A review of the project was done in the third and fourth quarters of 2021 with the following results:

- The project enhanced access to water for agricultural activities in Sector 5 target villages. Beginning in December 2020, 1,188,000 m<sup>3</sup> of water was pumped through the system gradually increasing to reach 6,415,200 m<sup>3</sup> in May 2021 (GOLD, 2021). Since the completion of the project, a total of 37,864,800 m<sup>3</sup> of

water was pumped through the system over a period of six months.

- Access to irrigation water enabled farmers to increase the overall cultivated area in Sector 5 target village to 3,565 ha in the 2021 winter season, more than double the area of land that was cultivated in 2019 (1,642 ha) and exceeding what was planned under the Deir-ez-Zor Governorate Agricultural Plan for 2020/21 (3,330 ha) by 263 ha (2021, MAAR).
- There was a nearly five-fold increase in the total crops production from 2,801 tons in 2019 to 15,640 tons in 2021, higher than the two-fold increase in the area of cultivated land, signalling gains in overall productivity of cultivated lands benefitting from the project. The expanded access to irrigation water allowed farmers to increase land productivity by practicing intensive farming where 462.5 ha were used to cultivate multiple crops in a given agricultural season.
- The total production of winter crops was 11,386 tons in 2021, a 8-fold increase from the 1,415 tons produced in 2019 prior to the project. The total production of summer crops increased 3-fold, with a total yield of 4,254 tons, as compared to 1386.5 tons in 2019.
- Wheat is the main winter crop in Deir-ez-Zor, its production increased by almost 10-fold reaching a total of 11,000 tons in 2021 compared to 1,275 tons in 2019.
- As a result of the increased supply of wheat, local bread prices trended favourably lower in the area (al-Quriyeh market) in 2021 compared with the prices in previous years.
- An increase in the total number of livestock was observed in the Sector 5 target villages following the completion of Sector 5 rehabilitation project, with qualitative evidence indicating an increase in access to fodder and water possibly as a result of the project.
- Following completion of Sector 5, only 14 percent of beneficiaries reported that they did not have enough food or money to buy food as compared with 100 percent before the rehabilitation. This was further marked by a 52 percent reduction in consumption coping strategies after the project.

<sup>1</sup>WFP. 2019. Season Livelihood Programming Report: Syrian Republic, Deir-ez-Zor Governorate.

<sup>2</sup> Seasonal Livelihood Programming is a tool used by WFP to identify short and long-term livelihood interventions in a given community through a consultative process.

- Most beneficiaries reported that the intervention had improved their production of crops, some of which were consumed by their families, and/or had increased their income (87 percent and 63 percent, respectively).

Overall, the Sector 5 project benefitted 16,000 households, securing the livelihoods of 11,500 farmers with direct access to irrigation water by enabling them to resume farming activities as well as livestock keeping activities. Additionally, an estimated 4,500 household benefitted indirectly through income generated as daily workers in farming and livestock activities, or as traders or daily workers in the local market.

The project yielded positive impacts for women and girls. With an increase in productivity, demand for daily laborers for weeding and harvesting benefitted women who are traditionally responsible for these roles. Women also

began participating in the labor market as produce traders and vegetable processors. With the increased sense of stability, families started to report reduced interest in early marriage and were more invested in sending their children including girls back to schools.

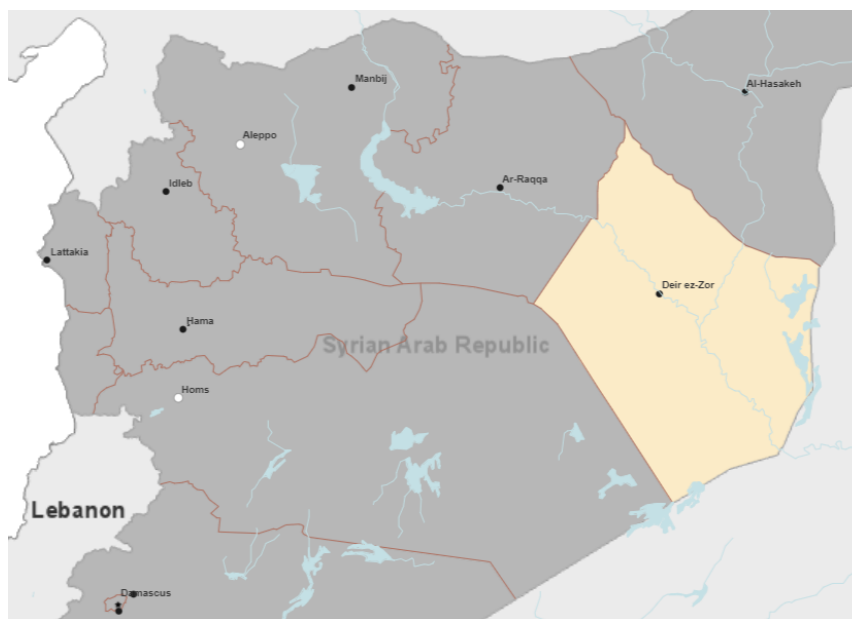
The rehabilitation of irrigation infrastructure in Sector 5 was critical for restoring agricultural production and strengthening farmers' resilience to achieve enhanced levels of socio-economic stability. This project was vital for enhancing protection of natural resources and sustaining agricultural cultivation practices in the area. Projects such as Sector 5 can have a powerful and far-reaching impact on the resilience of communities recovering from years of crisis.

## BACKGROUND

Deir-ez-Zor Governorate, second largest governorate in Syria, is located on the banks of the Euphrates River. It is home to the largest city in eastern Syria and seventh largest in the country, the city of Deir-ez-Zor (Figure 1).

Over the years, agriculture has been the main source of income for most of the population in the Governorate. With an annual rainfall less than 150 mm/year, the Euphrates River has historically been relied upon as the main source for water supply for the people in Deir-ez-Zor, including for agriculture.

Figure 1: Deir-ez-Zor on map of Syria



During the crisis, the irrigation systems were severely damaged in Deir-ez-Zor. To cope, farmers relied on underground water to irrigate their fields, which increased the soil salinity resulting in reduced agriculture production. Additionally, many households in the area reported inadequate food consumption due to the lasting impacts of the crisis, which include destruction of public infrastructure, economic recession, loss of lives and properties, and outmigration, particularly of youth.<sup>3</sup> Beyond being highly food insecure, Deir-ez-Zor is highly exposed to natural shocks, such as drought.<sup>4</sup>

The crisis also created a shift in the workforce structure of the agricultural sector, where women increasingly joined the agricultural workforce. With many women becoming the sole breadwinners in their households, many turned to agriculture as a source of livelihood to support their families. Accordingly, being new to this labor market, female farmers tended to have limited farming skills, in comparison to their male counterparts, as well as limited

experience in producing and marketing their products, often lacking access to information about funding and training opportunities.<sup>5</sup>

As the security environment gradually stabilized in many parts of Syria and access has improved, the opportunity for livelihood interventions that support resident communities, returnees, and internally displaced populations (IDPs) and facilitate access to key production inputs (particularly water), became increasingly possible.

The Integrated Context Analysis<sup>6</sup> (ICA) conducted by WFP showed that the area of Sector 5 is one of the areas with the highest food insecurity and the most extreme exposure to shocks. To understand the needs of the local communities, WFP conducted a Seasonal Livelihood Programming<sup>7</sup> (SLP) consultation at district level in 2019. As a result of the livelihoods prioritization exercise, the local communities highlighted the need to rehabilitate the irrigation network.

<sup>3</sup>WFP. 2019. Season Livelihood Programming Report: Syrian Republic, Deir-ez-Zor Governorate.

<sup>4</sup>In the framework of the Integrated Context Analysis (ICA), Deir-ez-Zor was categorized as "Area 2a", characterized by medium food insecurity and high exposure to natural shocks – both drought and floods (VAM, 2020).

<sup>5</sup>FAO - News Article: Syrian women food producers learn new skills from Italian farmers

<sup>6</sup>The Integrated Context Analysis is part of WFP's Three-Pronged Approach (3PA).

<sup>7</sup>Seasonal Livelihood Programming consultations are part of WFP's Three-Pronged Approach (3PA).

The community's prioritization exercise matched with WFP's strategic reorientation for livelihoods and resilience activities initiated in 2019. This reorientation focused on transitioning from household-level activities towards communal assets rehabilitation, restoration of food systems, and value chains. Hence, WFP identified the rehabilitation of the Sector 5 irrigation system in Deir-ez-Zor as a priority for early recovery in coordination with the Food and Agriculture Organization (FAO) and local communities. The rehabilitation of communal irrigation networks in Deir-ez-Zor was identified as critical to help smallholder farmers in the area stabilize their food security and resume their agricultural activities, their main livelihood source.

The rehabilitation of the Sector 5 irrigation system fit well within WFP's Strategic Outcome 2 of the Interim Country Strategic Plan (ICSP 2019-2021), which focused on enabling food insecure families in urban and rural areas affected by the crisis to meet their basic food and nutrition needs and increase their self-reliance. The project was implemented in collaboration with the Food and Agriculture Organization (FAO) and included technical inputs from the Ministry of Agriculture and Agrarian Reform (MAAR) and the Ministry of Water Resources (MoWR), and with direct involvement of the local community. This project was the first intervention of its type geared towards building community resilience through the rehabilitation of community agrarian assets.<sup>8</sup>

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<sup>8</sup> WFP Syria livelihood multi-layered approach is articulated around different levels interlinked with each other, all contributing to the ICSP 2019-2021 Strategic Outcome 2:

- Rehabilitation of community assets that protect access to food and promote self-reliance for the entire communities
- Conditional FFA supporting food insecure households meeting food and nutrition needs in exchange for their participation in livelihood activities
- Restoration and enhancement of staple food value chains (primarily bread) improving food security and nutrition of crisis-affected communities

# PROJECT OVERVIEW

Sector 5 irrigation system is located to the south-east of Deir-ez-Zor City in Al-Mayadeen area. It consists of 170 km of irrigation channels, 44 drainage wells, a main pumping station and a lifting station (Figure 2), all of which were badly damaged during the crisis. The irrigation sector serves four main villages: Mahkan, Quriyeh, Swedan Shameh and Gharibeh. The villages have up to 5,200 hectares (ha) of cultivatable land of which 3,565 ha are irrigated by the Sector 5 scheme.

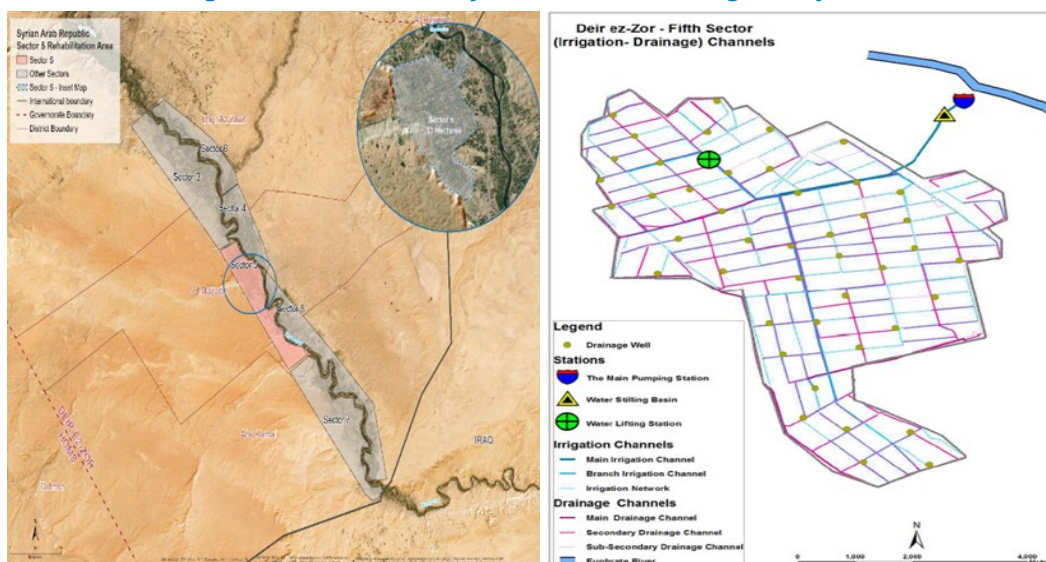
Before the crisis, the villages of Sector 5 were mainly reliant on irrigated agriculture and animal raising activities. These villages suffered major losses due to the destruction of the communal irrigation systems and water pumps that used to transport the water from the main river to the farms. In 2019, only 31 percent of the available

agricultural lands were cultivated, with wells providing the main irrigation source. Moreover, an assessment by MAAR in 2019 found the number of livestock in the area at only 13 percent of pre-crisis levels (SLP Report, 2019).

In response to these challenges, the Sector 5 irrigation system rehabilitation project was designed to address the livelihoods needs of the four nearby villages based on consultations with the local community, with the following project goal:

To improve agricultural productivity of food insecure and vulnerable farmers, restore their livelihoods and strengthen their food security in the four target villages belonging to Sector 5 – namely: Mahkan, Quriyeh, Swedan Shameh and Gharibeh.

**Figure 2: Sector 5 Water system location and irrigation system**



In order to achieve the overall goal, the following outcomes were outlined for the project:

1. Improve agricultural productivity through:
  - Restoring irrigation capacity from the Euphrates River for 3,565 ha;
  - Enhancing the sustainable use of cultivated land by stopping harmful practices that increase the risk of salination; and
  - Encouraging farmers to resume livestock activities.
2. Promote other non-agricultural activities such as machine maintenance, seeds and chemicals stores, wholesale markets, and transportation; and

3. Encourage households to return to their areas of origin and reactivate the economic life.

The project aimed to directly and indirectly support up to 6,000 smallholder farming households in different water basins (up to 30,000 people).

In order to achieve the outcomes above, the project pursued the following key outputs during 2019-2020:

- a. Conducting the technical assessment of the system (Led by FAO, in collaboration with GOLD, and WFP)
- b. Procuring and installation of equipment and machinery as per the above-mentioned assessment (Led by WFP)



- c. Supporting farmer-led irrigation management (Led by FAO and supported by GOLD and the Directorate of Agriculture and Agrarian Reform (DAAR))
- d. Supporting sustainable use of natural resources by providing pumps for 44 drainage wells (Led by WFP and supported by GOLD)
- e. Supporting the livelihood of vulnerable smallholder farmers through food assistance for assets (FFA) activities and assets transfers, such agricultural inputs to resume farming activities in addition to training (Led by WFP and supported by GOLD and DAAR)

Through achieving the above outcomes, Sector 5 rehabilitation project would eventually contribute towards a wider impact for the community of Al-Mayadeen subdistrict and eventually in Deir-ez-Zor at large namely by:

1. Increasing household income and improving food access for the entire community; and
2. Increasing food supply across Deir-ez-Zor Governorate.

The project budget was determined at USD 2.83 million, which was largely owing to the cost of rehabilitation needed for the water pumping and lifting stations. This was funded in part by bilateral donor contributions and WFP internal resources.

## REVIEW METHODOLOGY

In July 2021, WFP conducted a review of the Sector 5 irrigation system rehabilitation with the dual purpose of organizational learning and accountability. The review focused on evaluating the process and outcomes of the project. Findings and recommendations will be used to inform similar area-based livelihood interventions in Syria. Evidence from the review will also inform the implementation of the new WFP Syria ICSP 2022-2023 and the revised livelihood strategy.

The review adopted a theory-based approach conducting a desk review for the project documents, in addition to using mixed methodology (i.e., qualitative and quantitative methodology) for data collection. Both primary and secondary sources of data were used to inform the review. For more details, please refer to [Annex 1](#).



# RESULTS

## Section A: Improved agricultural productivity and agricultural practices

### Result 1: The project enhanced access to irrigation water for agricultural activities in Sector 5 target villages

Following the intervention, Sector 5 target villages relied on the main irrigation channel as the source of water supply for 68 percent (3,565 ha) of the arable land in the sector whereas the remaining 32 percent (1,642 ha) benefitted from farmer cooperatives' irrigation systems and pumping stations or underground water to access water from the river. The reliance on the irrigation system varied according to different villages ranging from 80 percent in Swedan Shameh to 48 percent in Mahkan (as shown in Table 1).

**Table 1: Total area of agricultural land in target villages with access to Sector 5 irrigation channel**

Village	Land with access to irrigation channel		Land with access to other sources of irrigation		Total cultivable area ha
	ha	%	ha	%	
Mahkan	450	48	490	52	940
Quriyeh	1,500	80	357	19	1,857
Swedan Shameh	1,263	68	587	32	1,850
Gharibeh	352	63	208	37	560
<b>Total</b>	<b>3,565</b>	<b>68</b>	<b>1,642</b>	<b>32</b>	<b>5,207</b>

The damage of the irrigation system after the onset of the Syrian crisis had a great negative impact on access to water for a large proportion of the arable land in Sector 5. To compensate, farmers relied on underground water shallow wells as a source for irrigation. This was a highly unsustainable solution both environmentally and economically for the farmers.

After the completion of the rehabilitation project of Sector 5 irrigation system, a total amount of 1,188,000m<sup>3</sup> of water was pumped through the system in December 2020. The amount of water pumped increased gradually, based on the cultivated area and the water need of cultivated crops in each month, to reach a total of 6,415,200 m<sup>3</sup> in the month of May 2021 (GOLD, 2021). bringing the total amount of water pumped down the irrigation system to 37,864,800 m<sup>3</sup> over a period of 6 months (show in Table 2).

**Table 2: Amount of water pumped in Sector 5 rehabilitated irrigation system in m<sup>3</sup> (2020-2021)**

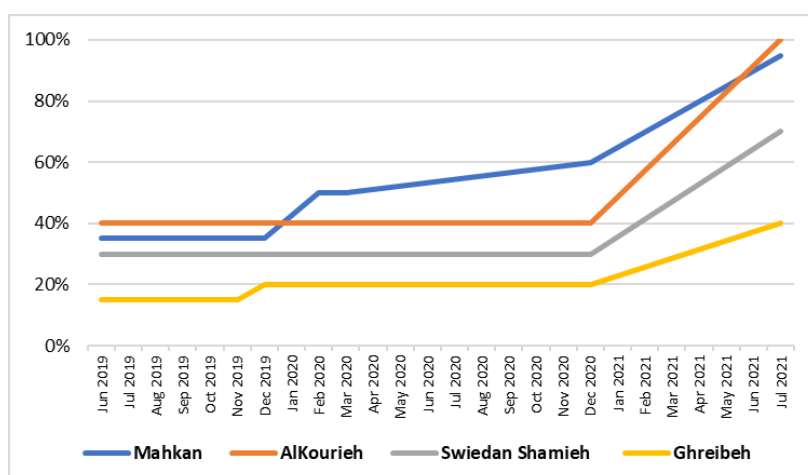
Year	Month	Amount of water pumped (m <sup>3</sup> )
2020	December	1,188,000
2021	January	4,978,800
	February	4,978,800
	March	10,008,000
	April	10,296,000
	May	6,415,200
<b>Total</b>		<b>37,864,800</b>

Source: GOLD, 2021

The surge in irrigation benefited both the lands with direct access to the irrigation system (the main target of the project), as well additional land that relied on farmer cooperative pumping stations that indirectly benefited from the access to the rehabilitated irrigation system.

As a result, all target villages experienced an increase in farms access to irrigation water, with access ranging from a maximum of 100 percent of agricultural land in Quriyeh to 40 percent of the land in Gharibeh by June 2021 (Figure 3). This was further supported by the feedback from interviewed farmers from both Swedan Shameh and Gharibeh who raised concerns about irregular access to water in their villages. Farmers attributed this interrupted access to the lack of adherence to the irrigation schedule by the farmers in villages upstream (Mahkan and Quriyeh), which affected the amount of water received at the two villages further downstream.

**Figure 3: Availability of Irrigation Water in in the four villages (Proportion of cultivated land benefitting from Sector 5 irrigation)**



Source: GOLD, 2021

The increased access to irrigation water coupled with the reduction in utilization of underground water improved land productivity. In addition, it helped farmers reduce

costs related to irrigation and the need for purchasing gasoline to operate the formerly used irrigation pumps.

**Highlights:**

- Sector 5 project significantly increased access to irrigation water with a total of 37,864,800 m<sup>3</sup> of water pumped from December 2020 to May 2021 in contrast to the complete absence of irrigation water prior to the project.
- All four villages experienced increased availability of water ranging from a maximum of 100 percent of agricultural land in Mahkan to 40 percent of the land in Gharibeh.
- The access to water increased farmers savings on the cost of irrigation that was incurred due to needed purchases of gasoline to operate water pumps

**Result 2: The project contributed to increase cultivated area in Sector 5 target villages**

The access to irrigation water enabled farmers to increase the overall cultivated area in Sector 5, bringing it to a total of 3,565 ha in the 2021 winter season. This is more than double the area of land that was cultivated in 2019 (1,642 ha) and exceeding what was planned under the Deir-ez-Zor Governorate Agricultural Plan for 2020/21 (3,330 ha) by 263 ha (MAAR, 2021).<sup>9</sup>

Table 3 and Figure 4 below show an increase in the proportion of cultivated land out of the total arable land in target villages. In July 2021, cultivated land reached 1,550 ha (83 percent of total arable land) in Quriyeh, 1,400 ha (76 percent) in Swedan Shameh, 940 ha (100 percent) in Mahkan, and 440 ha (77 percent) in Gharibeh (GOLD, 2021). This contrasts with the limited cultivated area before the project, which ranged from 38 percent of the arable land in Swedan Shameh to a maximum of 58 percent in Quriyeh. Swedan Shameh showed the largest change in the total cultivated area before and after the

project, which amounted to 100 percent increase, in contrast to 47 percent increase in Gharibeh.

**Table 3: Change in the total area of Sector 5 target villages' cultivated land in hectares, July 2020-2021**

Village	Total cultivable land in ha	Cultivated land in July 2020 in ha <sup>8</sup>		Cultivated land in July 2021 in ha <sup>10</sup>		Change in cultivated land ha	
		Area	Percentage	Area	Percentage	Area	Percentage
Mahkan	940	500	53%	940	100%	440	88%
Quriyeh	1,857	900	58%	1,550	84%	650	72%
Swedan Shameh	1,850	700	38%	1,400	76%	700	100%
Gharibeh	560	300	54%	440	77%	140	47%
<b>Total</b>	<b>5,207<sup>11</sup></b>	<b>2,400</b>	<b>46%</b>	<b>4,330</b>	<b>83%</b>	<b>1,930</b>	<b>80%</b>

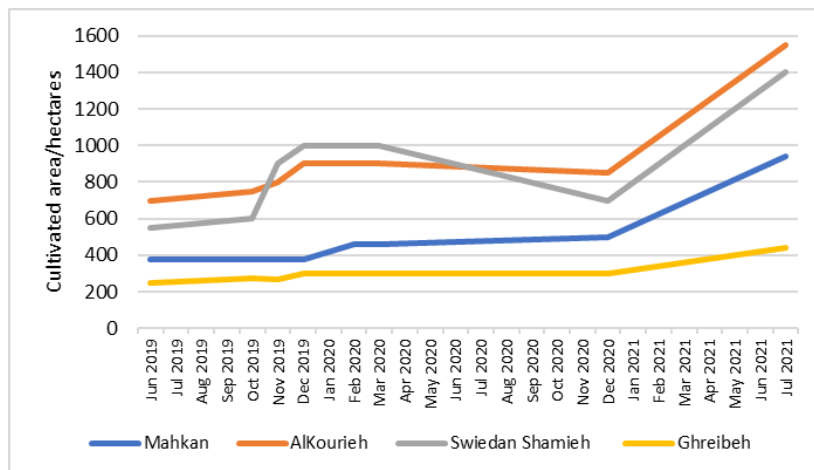
Source: GOLD, 2021

<sup>9</sup>The total cultivated area in Sector 5 is 5,207 hectares, of which 3,565 hectares are irrigated from Sector 5 and the remaining hectares are irrigated from farmers associations.

<sup>10</sup>July 2020 is used for comparison as the access to irrigation water through the rehabilitated system started by the end of December 2020.

<sup>11</sup>Land within Sector 5 scheme is 3,565 ha.

**Figure 4: Cultivation area in Sector 5 target villages**



Source: GOLD, 2021

The total amount of area cultivated in Sector 5 target villages includes both the area with direct access to the irrigation system (3,565 ha representing 68 percent of cultivable land in the sector, as explained earlier) in addition to 765 ha indirectly benefiting from the rehabilitation through farmer cooperative pumping stations.

This expansion beyond Sector 5’s direct catchment area was supported by findings from WFP Landscape Impact Assessment that showed a sharp increase in vegetation health and crop dynamics before and after the rehabilitation of the water sector as shown in Figures 5.

**Figure 5: Satellite imagery of cultivated area in 14 April 2020 (before the project) in contrast to 9 April 2021 (after the project)**



**Highlights:**

- The total area of cultivated land in Sector 5 more than doubled, increasing from 1,642 ha in 2019 to 3,565 ha in 2021 after completion of rehabilitation.
- All villages showed an increase in the total land cultivated after the rehabilitation. In July 2021, 76 to 100 percent of total cultivable land was cultivated in the four target villages (AlKourieh had a total of 1,550 ha (84 percent), Swedan Shameh 1,400 ha (76 percent), Mahkan 940 ha (100 percent), and Gharibeh 440 ha (77 percent).

### Result 3. The project increased local production and productivity for key seasonal crops in target villages

#### Increased overall productivity of seasonal crops in Sector 5 target villages

Sector 5 target villages, and particularly Quriyeh, were important agricultural villages and sources of food production for Deir-ez-Zor governorate prior to the Syrian crisis in 2011. The Sector 5 rehabilitation project brought water to the villages and once more the production started to increase in all four villages, as shown in Table 4. There was over a five-fold increase in the total crops production from 2,801.5 tons in 2019 to 15,640 tons in 2021, higher than the two-fold increase in the area of cultivated land, signalling gains in overall productivity of cultivated lands in the area.

The expanded access to irrigation water allowed farmers to increase land productivity by practicing intensive

farming.<sup>12</sup> In fact, out of the total cultivated land in Sector 5 (4,330 ha in July 2021), 462.5 ha were used in intensive farming, thus bringing the total area that was effectively used to cultivate different crops to 4,792.5 ha. Swedan Shameh was the leading village in applying intensive farming with 208.5 ha being used for cultivating multiple crops during the winter and summer agricultural seasons. This is corroborated by findings from Key Informant Interviews (KII), which indicated Swedan Shameh farmers are more experienced and trained in these techniques. Mahkan had the lowest area used for intensive agriculture with only 24 ha used for multiple crop cultivation.

**Table 4: Total production of crops and land in the four villages (2019-2021)**

Village	2019		2020		2021		Total cultivated area (ha) <sup>13</sup>	Intensive farming area (ha)
	Area (ha)	Production Ton	Area (ha)	Production Ton	Area (ha)	Production Ton		
Mahkan	413.5	702.8	777	925	964	2,440	940	24
Quriyeh	453	672.2	877	1,398	1677.5	5,923	1,550	127.5
Swedan Shameh	413.5	933	839.5	1,443	1608.5	5,717	1,400	208.5
Gharibeh	210	493.5	528.5	602	542.5	1,560	440	102.5
<b>Total</b>	<b>1,490</b>	<b>2,801.5</b>	<b>3,022</b>	<b>4,368</b>	<b>4,792.5</b>	<b>15,640</b>	<b>4,330</b>	<b>462.5</b>

Source: GOLD, 2021

#### Increased overall productivity of winter crops in Sector 5

Wheat and barley are the key winter crops in Sector 5 along with winter vegetables (e.g., cabbages, spinach, cauliflower, etc.). Wheat was the main winter crop with wheat cultivated land amounting to 95 percent of the total cultivated area in 2019 (Table 5). Prior to the Sector 5 rehabilitation, the total production of all winter crops was 1,415 tons using 1,163.5 ha of land.

In 2021, the total production of winter crops increased almost 10 times bringing its total yield to 11,386 tons produced by cultivating more than 3 times the area of land (3,953 ha). This remarkable increase in productivity

was greatly driven by increases in wheat production, which comprised 11,000 tons of the total winter crops production (Table 6). This significant impact was also supported by the efforts of the General Organization for Seed Multiplication (GOSM), which provided farmers with improved sorted and sterilized seeds at competitive prices. In addition, the General Establishment for Grain Trade and Marketing, Syrian Grain, provided a guaranteed price and market for wheat. By adding a profit margin to the costs of producing one kilogram of wheat, farmers were able to access farming inputs such as seeds and fertilizer from an Agricultural Cooperative Bank or from

<sup>12</sup>Intensive farming refers to utilizing the same agricultural area to cultivate more than one crop in a single agricultural season thus maximizing the seasonal crop yield per ha of land. Hence when reporting the area cultivated it will exceed the total surface area available for cultivation given that the same area is utilized more than once in a single season.

<sup>13</sup>The total cultivated area refers to the total land with direct access to irrigation system (3,565 ha) in addition to a percent of the land indirectly benefiting through farmer cooperative pumping stations which benefited from the water availability in the irrigation system (765 ha).

authorized agro-dealers registered. This was coupled with the agricultural extension services provided by agricultural extension units of the Directorate of Agriculture in the area. The increase in the area of cultivated lands led to an increase in demand for agricultural inputs and machinery.

This contributed to the overall increase in hectareage and improved yields for wheat. It is noteworthy to indicate that all these results would not have been achievable had the rehabilitation project not been completed in December 2020 which allowed Sector 5 farmers to benefit from the agricultural season.

**Table 5: Proportion of land cultivated by different winter crops in the four villages in ha (2019-2020)**

Crop	Wheat		Barley Grain		Winter vegetables		Total area
	ha	%	ha	%	ha	%	ha
<b>Total 2019</b>	1,100	95%	37.5	3%	26	2%	1,163.5
<b>Total 2020</b>	2,232	94%	65	3%	67.5	3%	2,364.5
<b>Total 2021</b>	3,810	96%	65	2%	78	2%	3,953

Source: GOLD, 2021

**Table 6: Winter crops production by area and yield in the four villages (2019-2021)**

crop	Wheat		Barley Grain		Winter vegetables		Total	
	Area (ha)	Production Ton	Area (ha)	Production Ton	Area (ha)	Production Ton	Area (ha)	Production Ton
<b>2019</b>	1,100	1,275	37.5	40	26	100	1,163.5	1415
<b>2020</b>	2,232	2,290	65	95	67.5	268	2,364.5	2653
<b>2021</b>	3,810	11,000	65	79	78	307	3,953	11,386

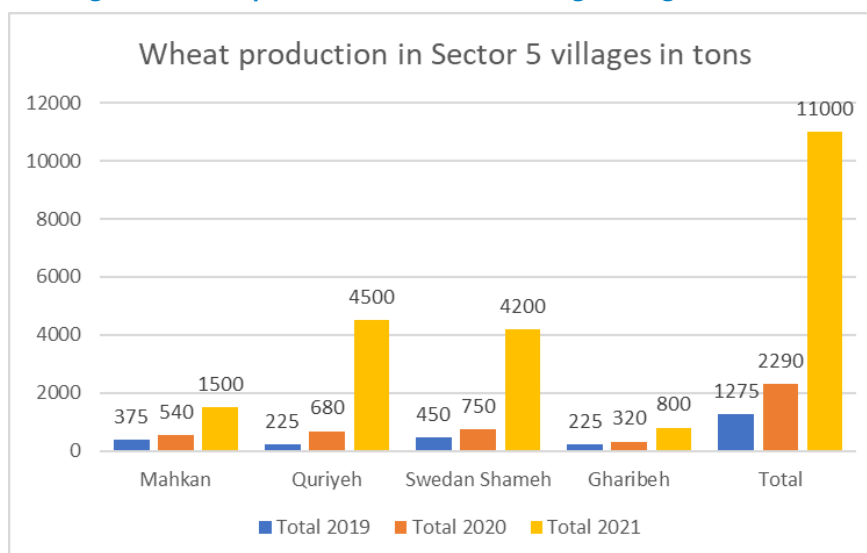
Source: GOLD, 2021

#### Increased wheat productivity across Sector 5 villages

The production of wheat surged across all four villages with the highest increase being in Quriyeh, which showed a 20-fold increase in production of wheat in 2021 compared to 2019, followed by Swedan Shameh

(9-fold increase). The two villages collectively represented 79 percent of the wheat production in Sector 5 irrigated area in 2021 (Figure 6).

**Figure 6: Wheat production in tons in the target villages (2019-2021)**



### Increased productivity of other winter crops across the Sector 5 target villages

Other winter crops<sup>14</sup> showed more limited increases in productivity compared to wheat. Gharibeh had the highest increase in crop yield (3-fold compared to 2019) (Table 7).

**Table 7: Other winter crops production yield in tons in the target villages**

Village	Mahkan	Quriyeh	Swedan Shameh	Gharibeh	Total
<b>Total 2019</b>	41	35	39	25	140
<b>Total 2020</b>	90	98	100	75	363
<b>Total 2021</b>	99	101	100	86	386
<b>Fold Increase 2019-2021</b>	<b>2.4</b>	<b>2.9</b>	<b>2.6</b>	<b>3.4</b>	<b>2.8</b>

Source: GOLD, 2021

### Increased overall productivity of summer crops in Sector 5

In 2021, the total production of summer crops increased 3-fold, bringing the total yield to 4,254 tons.

**Table 8: Summer crops production the four villages (ton) (2019-2021)**

Crops	Tomato	Cucumber	Cotton	Maize	Summer vegetables	Total
<b>2019</b>	395	450	255	27.5	259	1,386.5
<b>2020</b>	455	265	650	65	280	1,715
<b>2021</b>	1,345	1,450	800	84	575	4,254
<b>Fold Increase 2019-2021</b>	<b>3.4</b>	<b>3.2</b>	<b>3.1</b>	<b>3.0</b>	<b>2.2</b>	<b>3.1</b>

Source: GOLD, 2021

### Challenges for agricultural production

The cost of inputs, fertilizer and high-quality seeds, is likely to remain a challenge for farmers. As the head of the Farmers' Association explained, "even though the land has rested in the years where the Sector 5 was down, and the productivity in the first farming season in 2021 was acceptable, farmers will need to buy fertilizers from the second farming season forward, and the cost of fertilizer is high (SYP 100,000 per bag with each dunum needing 3-5bags) and the regular farmer cannot afford it.

The 2021 FAO Crop and Food Supply Assessment Mission to the Syrian Arab Republic Special Report show that prices of subsidized inputs, including fuel and fertilizers, increased in 2020/21, and the provision of fertilizers at subsidized prices ceased in June 2021.<sup>15</sup> The report also noted that seeds will likely be difficult to source due to the drastically reduced 2021 harvest in Syria, and seed quality is expected to be poor across the country.

**" We depended on the organization to support us with seeds and fertilizers, without this support it will be financially challenging to continue cultivating the land. " [Farmer in Gharibeh]**

<sup>14</sup>Winter crops include barley and winter vegetables e.g., cabbage, cauliflower, and spinach.

<sup>15</sup>FAO. 2021. Special report: 2021 FAO Crop and Food Supply Assessment Mission to the Syrian Arab Republic – December 2021. Rome. <https://doi.org/10.4060/cb8039en>



#### Highlights:

- Total crops production increased by over 5 times in Sector 5 from 2,801.5 tons in 2019 to 15,640 tons in 2021.
- The increased access to irrigation water allowed farmers to increase land productivity by practicing intensive farming where 462.5 ha were used to cultivate multiple crops in a given agricultural season.
- In 2021 the total production of winter crops increased almost 10 times bringing the total yield to 11,386 tons produced with wheat being the main winter crop in the Sector 5 irrigated area.
- Wheat production increased in the Sector 5 irrigated area by almost 10 fold reaching a total of 11,000 tons in 2021 compared to 1,275 tons in 2019.
- AlKourieh and Swedan Shameh represented 79 percent of wheat production in Sector 5 irrigated areas.
- In 2021, the total production of summer crops increased 3 fold, bringing the total yield to 4,254 tons as compared to 1,386.5 tons, produced by 326.5 ha in 2019.

#### Result 4. The project increased livestock keeping in target villages

In addition to agricultural activities, livestock keeping has been a long-standing livelihood activity in the target villages of the Sector 5 project catchment area. The livestock keeping activity was greatly affected after the start of the crisis due to lack of access to irrigation water, which had two main effects on livestock keeping. Firstly, it affected the availability of drinking water for livestock and secondly, it affected the availability of fodder. This was further complicated by the decrease in pastural areas in Deir-ez-Zor because of climate change and the decline in rainfall on the one hand, and limited access due to security concerns on the other hand.

As a result, livestock farmers resorted to selling their animals which they struggled to keep well fed. Livestock breeders were either unable to source enough fodder for their herds or were forced to purchase fodder at a high price due to its limited availability. This often led farmers to sell their livestock at a loss.

*"Fodder was being produced, but not a lot, due to little market and a not well-developed value chain" [Fodder and sheep trader at Al-Eshara Market]*

With the revenue generated from wheat production since the completion of the rehabilitation of Sector 5, as well as

increased production of fodder and straw, many farmers reinvested in livestock. As shown in Table 9 below, all Sector 5 target villages showed an increase in the total number for one or more types of livestock. The largest increase in sheep was in Mahkan from 12,000 to 27,519 heads (129 percent increase). In Quriyeh and Swedan Shameh the number of cows increased by 33 percent. For poultry, Quriyeh showed the highest increase among all Sector 5 villages (200 percent).

Despite an increase in overall livestock in all Sector 5 villages, Swedan Shameh showed a drop by 50 percent in the total heads of sheep. This could be attributed to the increase in cultivated land, reducing access to grazing area, and an increase in the price of fodder, which was found challenging to keep and maintain the high number in sheep in the village (40,000) thus bringing it down to 20,000, which is closer to the numbers reported in the other three villages.

The high price of fodder was reiterated by many of the interviewed farmers and key informants who indicated that despite the increase in production, lack of effective management of fodder prices challenged access to fodder needed to maintain livestock.

**Table 9: Number of livestock heads in the four villages 2020-2021**

	Sheep			Cow			Poultry		
	2020	2021	Difference (%)	2020	2021	Difference (%)	2020	2021	Difference (%)
<b>Mahkan</b>	12,000	27,519	129	250	300	20	600	800	33
<b>Quriyeh</b>	14,000	21,500	54	300	400	33	1,000	3,000	200
<b>Swedan Shameh</b>	40,000	20,000	-50	300	400	33	12,000	20,000	67
<b>Gharibeh</b>	18,000	19,000	6	1,500	1,800	20	1,000	1,500	50
<b>Total</b>	86,020	88,019	2	2,350	2,900	23	14,600	25,300	73

Source: MAAR, 2021

Mohamed is a 41 year old sheep trader and farmer from Quriyeh. He has 9 children. During the crisis, he and his family were displaced to the desert where they drank rainwater to survive. He became seriously ill with tuberculosis and the family was malnourished during that time. When they returned, his son was seriously injured by an explosive. Before the conflict, Mohamed used to plant alfalfa, barley and yellow corn for feeding his sheep. Mohamed has land on the irrigation project, which he has planted with fodder crops in order, to secure fodder for his livestock. "I lost 400 of my livestock, no food for them. The water has returned, and I promise just to plant fodder for my sheep." Mohamed feels that he has benefited from the 5 Sector irrigation project as his production has increased and improved his living situation.



In general, interviewed livestock keepers echoed the positive effect of Sector 5 rehabilitation project, namely because it ensures access to drinking water for livestock and to fodder.

"I am going to the field with 3 of my daughters every day for harvesting of jatt (alfalfa) using menjal (sickle) and our hands to feed our animals in my village and get money to feed my family, I am a widow, thank God for everything" [Female farmer in Quriyeh]

"My cow was hurt by a bomb, I took care of it until it became healthy, this year and after the irrigation water returned, I rented land from my relatives and planted it with jatt (alfalfa), only to feed my cows, I am Rania from Gharibeh" [Female farmer in Gharibeh]

This was also observed when conducting interviews at Al-Eshara market where the interviewed trader indicated that

as the livestock market has expanded, so has the secondary production of fodder and straw, which also benefitted from the increase of wheat production, a main source of straw. This was explained by one of the commissioners in the market (*Dalal*) who indicated that the quantities of fodder he is dealing has increased from 15 tons in 2019 to 100 tons in 2021 after the rehabilitation of Sector 5 irrigation system.

"I am a Dalal in Al-Eshara Market since many years, working as a commission man, getting 500 Syrian Pounds for each bag, I don't have a shop, I don't store or transport, I don't have a capital, so I don't get a risk, I am doing just a service for both the farmer and the breeder. In 2018, I did not work, there was no market at all. In 2019, dealing quantities were about 15 ton, increased to 30 ton in 2020, 100 ton in 2021 due to irrigation project of Sector 5 [KII: Al-Eshara market]

#### Highlights:

- All Sector 5 villages showed an increase in the total number for one or more of types of livestock. The largest increase in sheep was in Mahkan from 12,000 to 27,519. This was followed by Gharibeh where cows increased from 1,500 to 1,800. Poultry increased in Swedan Shameh from 12,000 to 20,000.
- Interviewees from farmers and fodder traders indicated an increase in access to fodder and water for livestock following the completion of Sector 5 rehabilitation project.

### Section B: Improved food security, livelihoods, and women economic empowerment

#### Result 5. The project improved food security and livelihoods of Sector 5 beneficiaries, contributing to their self-reliance

The previous sections showed how approximately 11,500 households (around 60,000 individuals) benefited directly from the project, by planting their own or rented lands on the irrigation channels. This in turn resulted in increase in the wheat production as well as other agricultural crops, as well as fodder production which contributed to the increase in the overall livestock in the Sector.

This surge in agricultural activity contributed in different ways to an increase in beneficiaries' self-reliance, access to food and improved food security. Following are the key findings reported by surveyed and interviewed beneficiaries from all four villages in Sector 5.

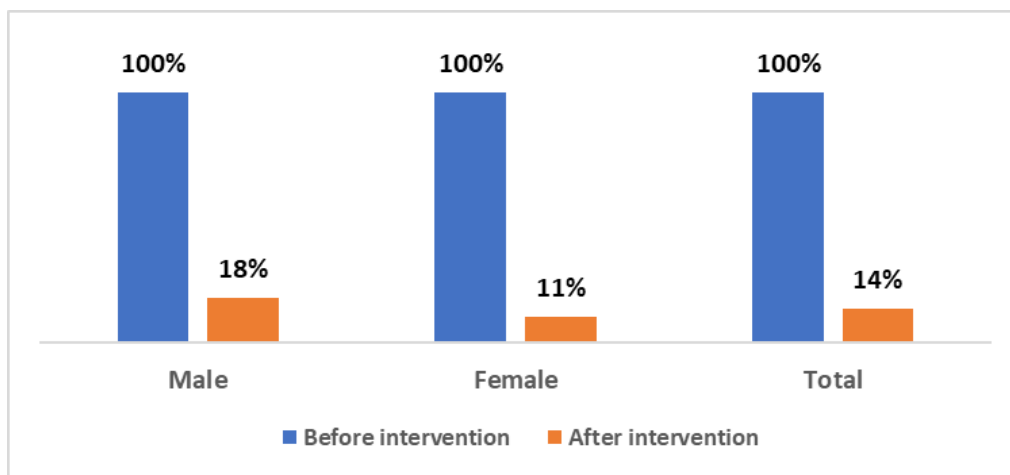
**Increase in income generation and access to food:**

Prior to the rehabilitation of Sector 5, all beneficiaries surveyed by WFP reported that they did not have enough food or money to buy food, in contrast to only 14 percent after completion of the project (Figure 7).

This was further supported by feedback from FGDs where farmers reiterated that with the increase in their income, they were able to spend on food, including purchasing meat, sugar, and salt.

*“Wheat sales gave us enough money to survive and start thinking about the future.”*  
 [Farmer from Quriyeh]

**Figure 7: Percentage of beneficiaries reporting not having enough food or money before and after the project according to gender of head of household**



Source: WFP, 2022

With regards to access to basic food needs, almost all the surveyed beneficiaries (97 percent) reported that the irrigation project in Sector 5 had positively affected their access to basic food.

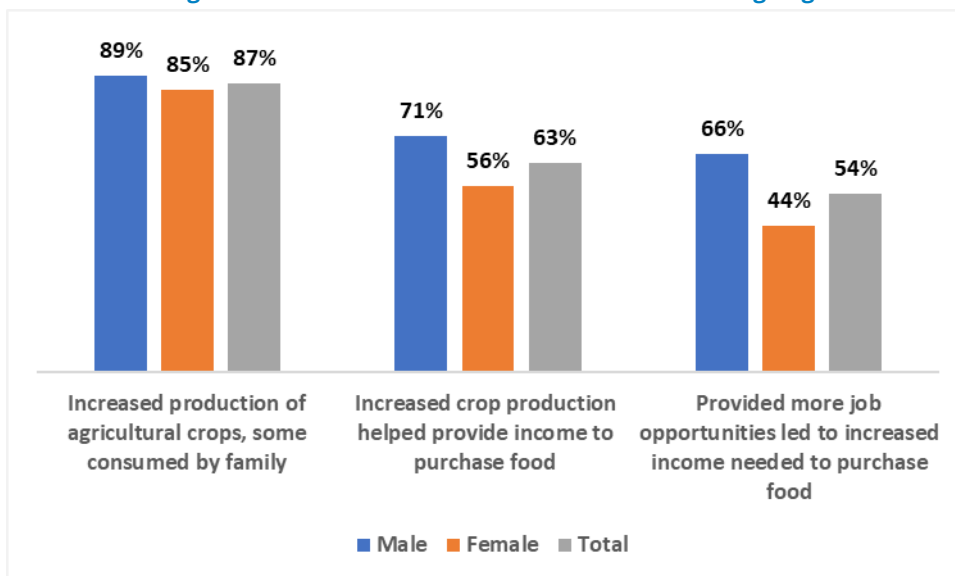
This was the result of direct consumption of cultivated crops, where 87 percent of the beneficiaries indicated using a proportion of their crop yields for their own household consumption e.g., wheat and vegetables. This was reiterated in FGDs, where farmers stated that their families returned to their previous habit of baking bread twice a day, after a hiatus of many years, thanks to the increased availability of wheat driven by the rehabilitation of Sector 5. In Makhan village, farmers stated that relying on their own bread production eased pressure from the one overcrowded bakery in their area.

In addition, 63 percent reported that the increased production of crops and subsequent sale increased their income and thus their ability to purchase additional food

items. This was particularly more frequently reported by male-headed households rather than female-headed households (71 percent versus 56 percent). Also, 54 percent of surveyed beneficiaries indicated increase access to job opportunities in the agricultural sector, which helped increase their income and subsequently their ability to purchase food in the market. Again, male-headed households were more likely to report benefiting from this than female-headed households (66 percent versus 44 percent). (Figure 8).

Key informant interviews with retailers and the mayor of Mahkan highlighted increased purchases of meat, eggs, cooking oil, rice, and other essential non-food items by community members. These results were corroborated by FGDs in Al-Eshara where participants confirmed moving from a diet based on dry commodities (lentils, chickpeas) to a diversified diet including fresh food items (eggs, chicken, vegetables, fruits, etc.).

**Figure 8: Factors contributing to access to food after the intervention according to gender of head of household**



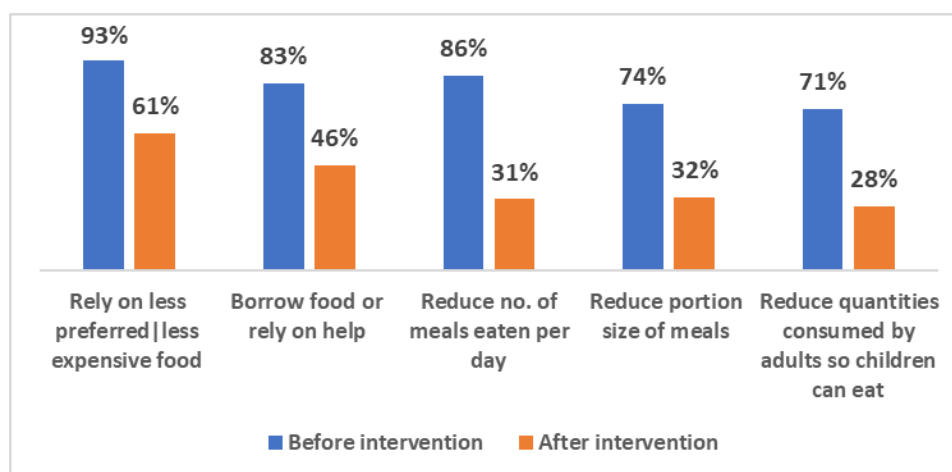
Source: WFP, 2022

### Reduced consumption coping strategies

Beneficiaries reported a marked reduction (52 percent) in food consumption coping strategies after the intervention. The proportion of households reducing the number of meals eaten per day or reducing quantities consumed by adults so that children could eat decreased, by 63 and 60

percent, respectively (Figure 9). FGDs reiterated these results, where participants from Swedan Shameh and Mahkan villages, stated that they were able to increase the frequency of their meals from two to three times per day.

**Figure 9: Reduced consumption coping strategies before and after the intervention**

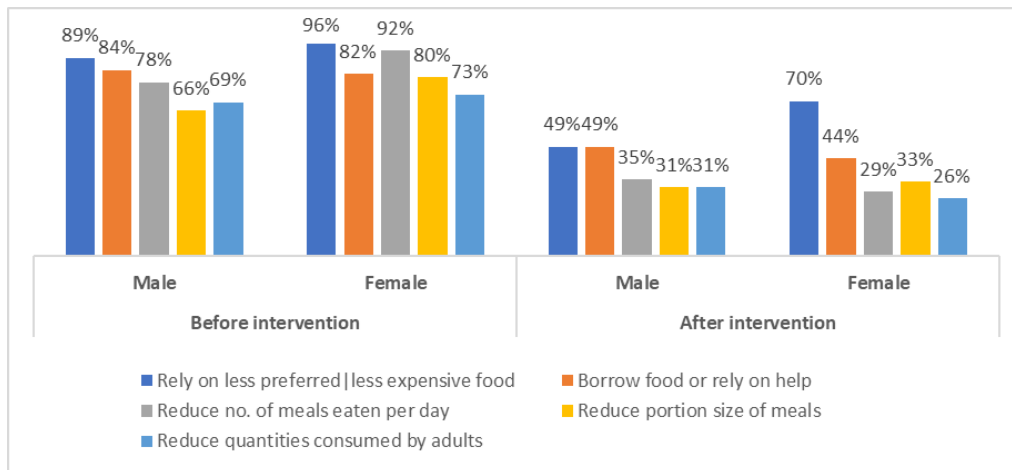


Source: WFP, 2022

Female-headed households were more likely to report reductions in consumption coping strategies after the intervention than male-headed households (53 percent versus 50 percent). As seen in figure 10, less women reported reliance on borrowing food, reduction of meals

per day (69 percent decrease) and reducing quantities of food consumed by adults so that children could eat (65 percent decrease), while male-headed household showed less reliance on less preferred or less expensive food and reduction of portion size of meals.

**Figure 10: Consumption coping strategies according to head of households before and after the intervention**



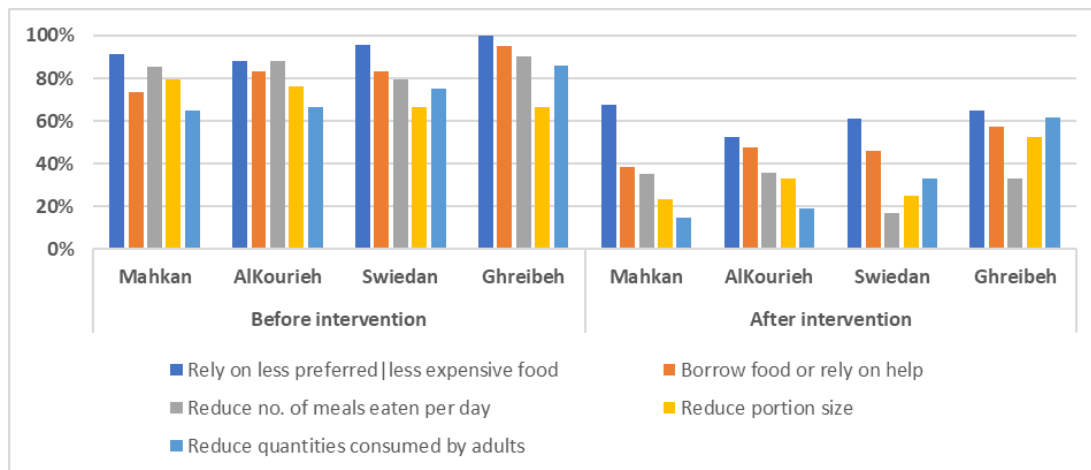
Source: WFP, 2022

When considering the difference between the four villages, we can see that beneficiaries in Mahkan, Quriyeh, and Swedan Shameh reported the largest reductions in consumption based coping strategies (56 percent, 54 percent, and 56 percent respectively). In Mahkan, there was a 77 percent decrease in households that reported reducing the quantities consumed by adults so that children could eat and a 70 percent decline in households that reported reducing portion size as a consumption coping strategies after the intervention.

In Swedan Shameh, there was a 79 percent decline in households reporting that they reduced number of meals eaten per day (Figure 11).

In contrast, farmers from Gharibeh, the village furthest from the pumping station, reported only a 37 percent reduction in consumption based coping strategies among beneficiaries. Notably, there was a 63 percent decline in households that reported reducing the number of meals as a consumption coping strategies after the intervention (Figure 11).

**Figure 11: Reduced consumption coping strategies by target villages before and after the intervention**

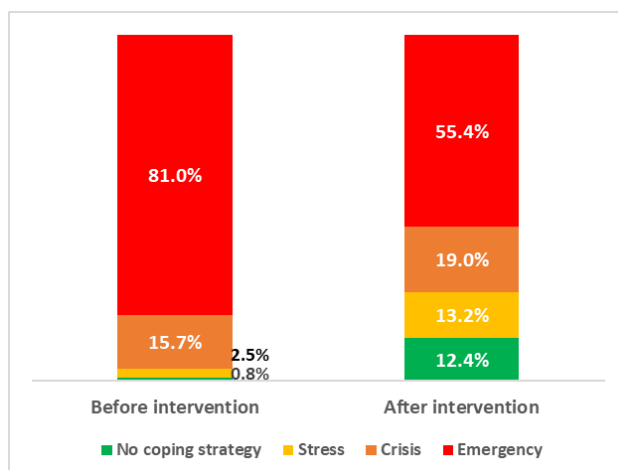


Source: WFP, 2022

### Reduction in livelihood coping strategies

When examining the livelihood coping strategies, we can see that the proportion of beneficiaries that reported engaging in any livelihood coping strategy decreased by 12 percentage points (Figure 12). Furthermore, the adoption of emergency coping strategies saw a 32 percent decline.

**Figure 12: Livelihood coping strategies before and after the intervention**

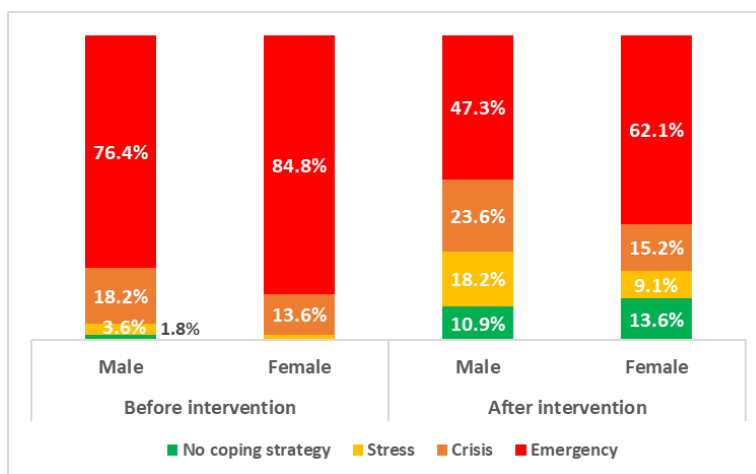


Source: WFP, 2022

Female-headed households reported greater benefits as a result of the project, with a 13 percent increase in the proportion of female-headed households not using any

livelihood coping strategies and a 27 percent reduction in female-headed households that employed emergency coping strategies following the intervention (Figure 13).

**Figure 13: Livelihood coping strategies among male- and female-headed of households before and after the intervention**

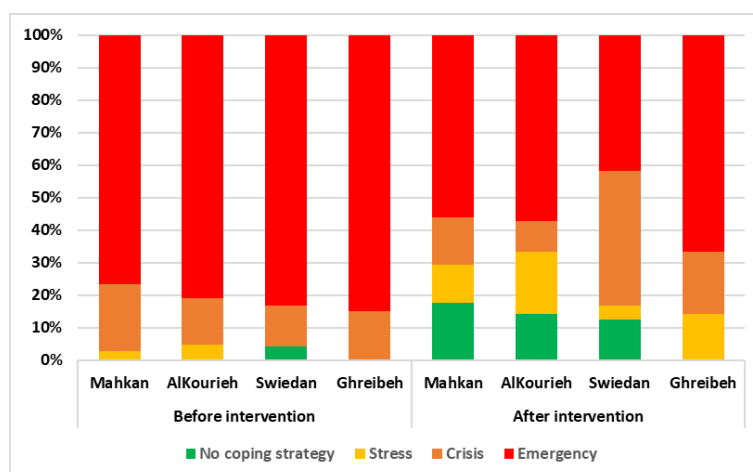


Source: WFP, 2022

Similar to the case in consumption coping strategies, beneficiaries in Mahkan, Quriyeh, and Swedan Shameh were more likely to report that they did not engage in any livelihood coping strategies following the intervention (18 percent, 14 percent, and 13 percent respectively). Swedan Shameh saw the largest reduction in beneficiaries

engaging in emergency coping strategies (83 percent pre-intervention versus 42 percent post-intervention). In Gharibeh, there was an 18 percent reduction in households that reported employing emergency coping strategies after the intervention, and none managed to report not using any coping strategy (Figure 14).

**Figure 14: Livelihood coping strategies by target villages before and after the intervention**



Source: WFP, 2022

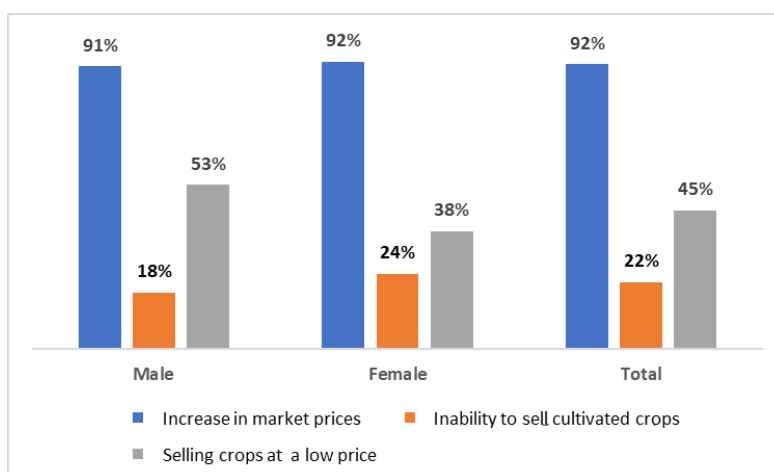
### Challenges to food access in Sector 5

Despite the aforementioned improvements in food security and livelihoods following the completion of the project, 12.6 percent of beneficiaries reported that they experience challenges to access food, mainly because of the increasing price of goods, selling produce at a lower price and in some cases, inability to sell crops (92 percent, 45 percent and 22 percent, respectively) (Figure 15).

This was also captured in FGDs where some participants confirmed that they “had reached self-sufficiency”, yet some reiterated that they were “able to meet some of their food needs but increasing market prices prevented

them from meeting all their needs”. For instance, in Quriyeh village, participants estimated that they could meet around 50 percent of their full food needs. In Swedan Shameh village, participants shared that “it needs three years for farmers to rely on themselves”. In Gheriebh, farmers explained that their families were very large and therefore, despite the increase in access to food, they could not meet the needs of all their household members.

**Figure 15: Barriers to food access according to gender of head of household in the four villages**

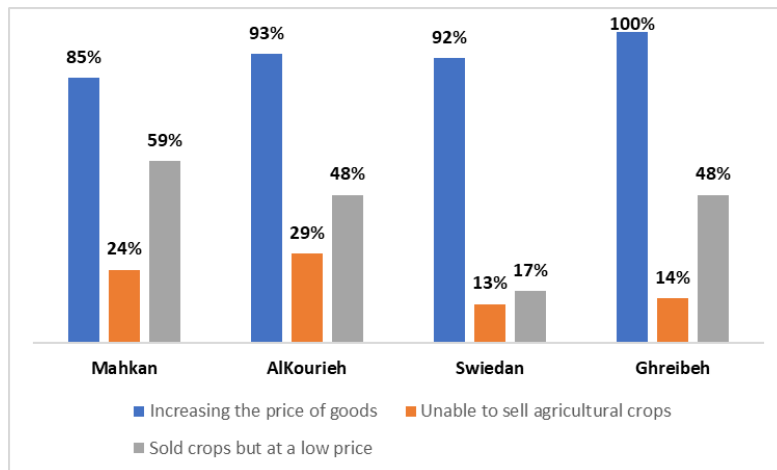


Source: WFP, 2022

Beneficiaries in Quriyeh were more likely to report that they experienced challenges with providing for their food needs than their counterparts in Mahkan, Swedan

Shameh and Gharibeh (21.4 percent versus 9.1 percent, 8.7 percent and 4.8 percent, respectively).

**Figure 16: Barriers to food access according to the four villages**



Source: WFP, 2022

#### Highlights:

- Sector 5 project secured the livelihoods of 11,500 households in nearby villages being farm owners or renters who had direct access to irrigation water enabling them to resume farming activities as well as livestock keeping activities.
- Following completion of Sector 5, only 14 percent of beneficiaries reported that they did not have enough food or money to buy food as compared with 100 percent before the rehabilitation. This was further marked by a 52 percent reduction in consumption coping strategies after the project.
- Most beneficiaries reported that the intervention had improved their production of crops, some of which were consumed by their families, and/or had increased their income (87 percent and 63 percent, respectively).
- Beneficiaries reported a marked reduction (52 percent) in consumption coping strategies after the intervention, and to a lesser extent in livelihood coping strategies, where the proportion of beneficiaries that reported engaging in any livelihood coping strategy decreased by 12 percentage points.
- Female headed households were more likely to report decrease in consumption and livelihood coping strategies.
- High prices remain a challenge to beneficiaries to meet their food needs after the project.

#### Result 6: The project empowered women economically and socially

Since the start of the crisis, women started increasingly working outside the home to earn income to support their families. Activities of women in the targeted area typically include producing agricultural crops, caring for livestock, processing and preparing food, working as casual labor in agricultural or other rural livelihood activities, collecting firewood and water, engaging in trade and marketing, caring for family members and maintaining their houses.

Flourishing agricultural activities in Sector 5 increased the demand for labor during the periods of planting, weeding,

and harvesting, which are activities primarily dominated by female farmers. This resulted in an increase of jobs availability for female farmers in Sector 5 villages.

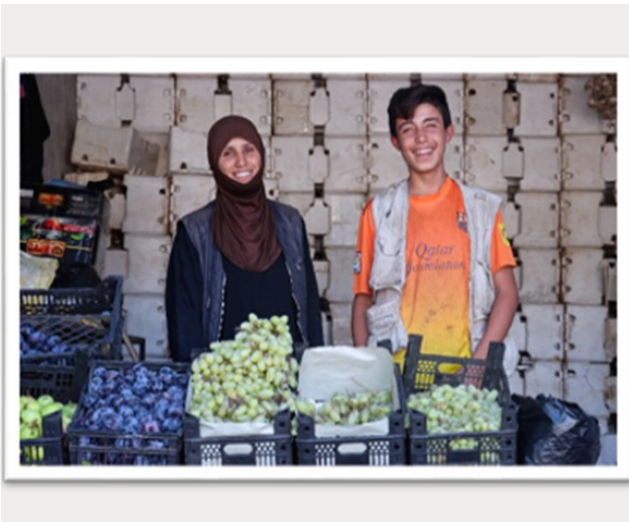
In addition to being part of agricultural labor workforce, qualitative findings indicated that more women in Sector 5 started to engage directly in farming through renting and sharing of lands rather than working as casual labor. On average, female farmers participating in FGDs experienced a 50 percent increase in their income.



Jamila is a 50-year-old widow, supporting her 11 children. In 2017, Jamila and her children fled their home in Mahkan due to the fighting and lived in a camp for a year. In 2018, the family returned to find their house destroyed so Jamila moved the family into a rented house. In order to feed her family, Jamila rented land but relied on water from a well on the land to resume planting. She was frustrated with the result of her efforts, due to the poor quality of the well water and its impact on the productivity of the crops. This coupled with the high input costs, such as fuel to operate the generator to pump water and regular maintenance, made life very difficult for Jamila. After rehabilitation of the Sector 5 irrigation system, Jamila was able to stop depending on the low-quality water well and started irrigating her field from the irrigation channels. Now she is self-sufficient with bread flour to feed her children.



The rehabilitation of the irrigation system had also created secondary job opportunities related to agricultural market activities namely trading and livestock breeding, and vegetable processing. In the FGDs, some women indicated starting their own business of trading vegetables and fruit.



Adila is a 32-year-old widow from Mahkan. Her house was destroyed during the conflict, so she and her children moved in with her husband’s mother whom she cares for. The family did not have land to farm, so she rented a small shop in Mahkan village. Every day Adila travels to the wholesaler market, Souk Al-Hal, and brings back fresh vegetables to sell at her shop. Adila is one of few women shop keepers in the market and she is well regarded by the wholesalers, as this is an unconventional job for women in the area. She noted that “before the crisis, it was a shame for women to go to the [wholesaler market]. Now I can feed my children and now I can go out [to the market] and no one says anything.” Adila, with support from sons, Faisal and Khaled, supply the village with fresh produce.

Also, female farmers with limited income started to work in processing vegetables and selling their packed products in the market to improve their income.

Haya, a 40-year-old woman, lives in Swedan Shameh with her husband and ten young children. The family was so poor before the conflict that the community built a house for them. Her husband has kidney disease, so much of the burden falls on her to provide for the family. The family left during the conflict and when they returned, they found their house destroyed. With no income source, they relied on their neighbours for assistance in order to survive. After the Sector 5 rehabilitation, Haya and her husband decided to rent land irrigated by the irrigation canals and plant wheat. The first year’s harvest was good, but the family continues to struggle so Haya works as a day laborer during harvesting season and processes vegetables with her children throughout the year. Next year, Haya plans to rent more land so that she can afford to send her children to school.



#### Highlights:

- Sector 5 project increased demand for daily laborers particularly for jobs related to weeding and harvesting. These jobs were predominated by female farmers.
- Female farmers also participated in the labor market as produce traders as well as working on small scale income generating activities related to vegetable processing.
- Female farmers started renting land instead of the regular laborer jobs and those married to farm owners indicated their participation in decisions around agricultural work and livestock care.

### Section C: Project timeliness, efficiency, and alignment to community needs

#### Result 7: The project was informed by community needs

In 2019, the WFP Livelihood Unit conducted Seasonal Livelihood Programming (SLP) sessions with community representatives, partners, and government representatives. The SLP aimed to identify and discuss the need of the communities in terms of food security, livelihoods, vulnerabilities and shocks and gender issues.

Many farmers reported adopting negative coping strategies to survive, such as selling assets and livestock, cutting meals, and eating less food so their children could eat.

This was the result of interruption of agricultural activities due to the damage of basic infrastructure in the area.

Additionally, the revenue from land was low because of the high cost of irrigation from wells due to the high price of fuel needed to pump water from the wells. As a result, farmers had turned to humanitarian assistance and external remittances. With no livelihood options, youth migrated from the area. For those working as day laborers, wages were insufficient to buy food from the local markets, particularly bread and vegetables, which were priced high due to low supply and high demand. These findings were also reported by the communities interviewed in the target villages after the completion of the project.

*“The situation was miserable and tragic, there was not any water for irrigation crops, you cannot imagine how bad it was.” [Female Farmer in Quriyeh]*

*“Getting bread was a heartbreak” [Male farmer in Swedan Shameh]*

*“In the beginning, we depended on the stored supplies from camps and then we started farming after the situation stabilized in the village. We had to shop for products from the farthest markets, surviving on the dried okra and depending on the previously saved assistance from monthly humanitarian aid.” [Female Farmer in Gharibeh]*

Through a consultation with the community representatives from the target four villages, WFP identified the following key interventions as a priority to revitalize the area:

1. Agriculture and Livestock- production, value chain development, extension, expansion;
2. Social Services- (Health, Education, Social Protection/ Safety Nets)
3. Infrastructure – construction and rehabilitation
4. Other income generation and livelihoods

The availability of irrigation systems was considered as an essential starting point to any livelihood activity in the area. Accordingly, the rehabilitation of communal irrigation networks in Deir-ez-Zor was selected as a priority as it would help smallholder farmers resume their agricultural activities, by providing an affordable and accessible source for irrigation.

In December 2020, water flowed through the irrigation system reconnecting local farms to the Euphrates River once again. It was the first time in years that families have had access to water close to their homes. Rehabilitation of the Sector 5 irrigation system has addressed the needs of farmers in the targeted area to resume/start their livelihood activities, offering displaced families a powerful incentive to return to their homes, raise livestock and provide fresh and healthy food for their families. There has been a steady return of farmers to the area, with 2,550 households returning since the completion of the rehabilitation project (Ministry of Local Administration and Environment, 2021).

“I am Shaila, I am a farmer from Gharibeh, do you see this land? I used to farm but for the past 2 years I did not use my menjal (sickle). Thirst killed us. Hunger killed us. Life has returned with the return of the water; I can work without stopping now. I irrigate my land, my cow is able to drink, I feed my children and grandchildren, we look fresh and smell good.”



#### Highlights:

- Sector 5 project was designed and selected as a priority for implementation after a consultative participatory process with the local community.

### Result 8: The project was implemented in a timely manner and in alignment with seasonal activities in Sector 5

Planning and implementation of the project were done in close consultation with FAO, national and local stakeholders, including the technical directorates of MAAR and MoWR, NGOs and local society organizations as well as the wider local community. As this was the first community asset rehabilitation project undertaken by WFP in Syria, there was a lengthy inception period. A joint Technical Working Group (TWG) based in Damascus was formed to provide oversight and take all the technical-management decisions; while a joint Site Engineering Team (SET) based in Deir-ez-Zor, was formed to inspect the site daily and ensure that the work and equipment/materials met the quality requirements clarified in the technical specifications and the approved technical offer. The site provision took place on 27 June 2020 with participation from the WFP and FAO Site Engineering Team and representatives from the General Organization of Lands Developments (GOLD). The contractor formally began the works on 28 June.

In October, two security incidences at the main pumping station resulted in the delay of transportation of the main equipment to Sector 5. MoWR built a protection wall along

the river side, protecting the whole compound of the main station which allowed activities to resume as scheduled. The installation of the main equipment in both stations was completed in December 2020. The project was tested and commissioned in mid-December 2020 with handover to GOLD. The final inspection took place at the end of January 2021.

While the project experienced delays related to the import of the necessary equipment and parts to repair the pumping and lifting stations, WFP was able to complete the rehabilitation in time to ensure availability of water around the seasonal activities related to farming – winter planting for wheat. An additional challenge encountered during implementation was ensuring the supply of electricity 24 hours a day for the station. While the Government has committed and ensured the availability of electricity around the clock from January 2021 till March of the same year, intermittent supply was experienced later on. Despite that, water pumping continued through 2021 contributing to the increase in land productivity as explained in earlier sections.

**Figure 17: The lifting station in Sector 5**



In addition to repairing the pumping and lifting stations, trainings were provided to the station operators on how to operate the station to achieve best practices and minimize the damages. FAO provided trainings to farmers in Sector 5 on the efficient use of water and the management of water associations. During FGDs, farmers indicated their interest in more trainings on the subject.

Following the completion of the pumping station and lifting station rehabilitation, the General Organization for

Land Development (GOLD) and MoWR started planning for irrigation channels and drainage system rehabilitation. WFP supported this plan by providing pumps and accessories for 44 drainage wells. GOLD has committed to install the pumps. Additionally, to ensure sustainability of the Sector 5 irrigation system, regular maintenance and access to replacement parts for pumping and lifting stations is required, as well as replacement of eroded flumes (irrigation canals).

**Figure 18: Water flow in Sector 5 main irrigation canal before and after rehabilitation in December 2020**



#### Highlights:

- The project was successfully completed before the end of 2020 winter agricultural season as planned despite the delays in implementation due to challenges with obtaining the different equipment.
- WFP and FAO invested in conducting technical assessments, rehabilitating the pumping and lifting stations, and building the capacity of local partners and communities on issues related to the maintenance of the canals to ensure the continuity and longevity of the investment, including the creation of four water user associations and 143 subgroups responsible for the field canals.

#### Section D: Overall impact for Sector 5 community

#### Result 9: The project created job opportunities and attracted additional investments in Sector 5 area

##### Creating job opportunities in the larger community

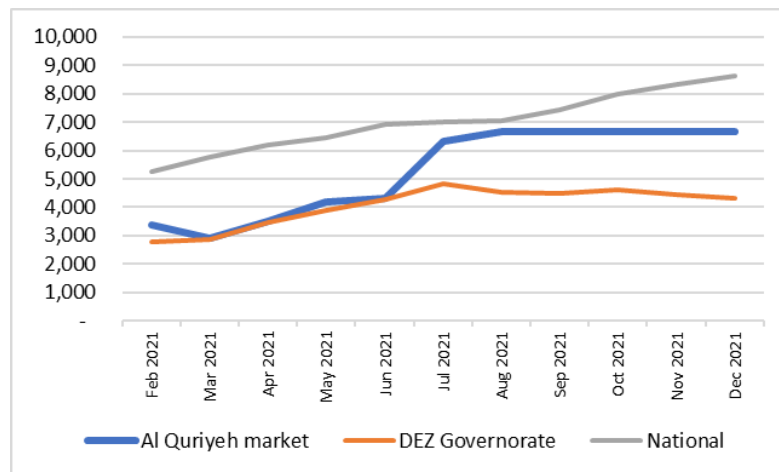
With the increase in crop production and subsequent expansion in livestock keeping, Sector 5 rehabilitation created a ripple effect in the local markets of Al-Mayadeen and Al-Eshara. The increase in supply of agricultural products generated commercial activities with the subsequent creation of jobs around these activities.

According to key informants from the markets, Sector 5 contributed to the increase in job opportunities related to traders and commission dealers (Dalal). It was reported that there was an increase in sheep traders from 10 to 50 traders, and fodder traders from 10 to 40 traders. In addition, one of the straw traders reported increasing his business from 1 to 4 shops. This indicates a significant increase in the agricultural market activity as a result of the project.

Moreover, secondary jobs emerged or were revitalized namely: produce shop keepers and produce processing jobs for female farmers. Lastly, as a result of the general increase in the markets activity, other commercial and trading markets benefited where regular shop keepers, porters, warehouse workers, carriage drivers, and even coffee shops, experienced an increase in their day-to-day activities and number of customers

It is estimated that an additional 4,500 households living in the target villages benefited indirectly through income generated as daily workers in farming and livestock activities, or as traders or daily workers in the local market (GOLD, 2021). This was reflected in the income of daily works where unskilled laborer wages showed a substantial increase in July 2021, remaining well above Deir-ez-Zor governorate average (6,500 compared to 4,000 SYP, Figure 19).

**Figure 19: Average Wage (daily laborers and unskilled workers)**



Source: WFP, 2021

### Attracting investments to the Sector and the governorate in large

In addition to increasing activities in the local market, Sector 5 rehabilitation project revived the area attracting other agencies to invest in the growing community and contribute to the resilience and empowerment of Sector 5 residents and returnees. The Sector 5 project paved the road for other similar early recovery interventions, showing not only that such type of interventions was possible in the context of the Syria crisis, but also necessary. This intervention and its enabling factors (field presence, donors support, technical capacity, vision, strategic reorientation) might be considered the first intervention at scale to support the structural revitalization of one of the countries' economic and social pillars for stability and cohesion. Following are the main investments that started in the region following the Sector 5 rehabilitation project:

- a. **UNICEF** expressed that the project has affected the priorities of their interventions in Deir-ez-Zor. With the increasing return of families to the area after strengthening their main income source, and the increasing needs for restoration of infrastructure services, such as drinking water and sanitation services, the area has become a priority and several projects are currently under contract, such as the rehabilitation of drinking water pumping stations, and the rehabilitation of the high reservoirs and water and sewage networks. UNICEF also indicated the increased interest of its partners across sectors to intervene and operate in the area. In addition, UNICEF started investing in the rehabilitation of schools to address the

increase in the number of students in the Sector brought about by increasing population in the Sector (DEZ WASH Sector\ Wash Officer, **UNICEF**, Deir-ez-Zor).

- b. **OXFAM** focused on supporting the agricultural associations, which cover a few hundreds of dunums, by rehabilitating some agricultural engines, and irrigation channels in Mahkan, Gharibeh, and Quriyeh.

### Increase number of Sector 5 population

Sector 5 experienced a continuous increase in the number of returnees to the villages after the rehabilitation of the irrigation system in Sector 5 which encouraged people to return to their villages, after living for many years in camps in Al-Jazera area. Since the rehabilitation of irrigation system, the total population in Sector 5 increased by 10,335 person (2,550 families) who returned to their villages to participate in the growing agricultural activity in the sector and starting their own livelihood activities.

Findings from FGD and KII supported these observations where they indicated that the completion of the project has acted as a pull factor in bringing households back to the area. There has been an increase in daily workers with whole families coming to Sector 5 to rent land or work for other landowners. Additionally, the head of the Farmers' Association in Quriyeh noted that the wave of migration have stopped since the completion of the rehabilitation project.

**Table 10: Population (families) increase in Sector 5 target villages (2020-2021)**

Village	2020	2021	Population increase (%)
Mahkan	2,500	2,850	16.7
Quriyeh	3,352	3,952	10.0
Swedan Shameh	3,200	4,700	11.1
Gharibeh	2,350	2,450	7.5
<b>Total</b>	<b>11,402</b>	<b>13,952</b>	<b>11.2</b>

Source: Ministry of Local Administration, Deir-ez-Zor Municipality, 2021

**Community investment in education including girls' education**

The increases in the total population were accompanied by an increase in the number of school age children in Sector 5, where the total number increased by more than 4,000 students in 2021 compared to 2020, with the largest increase being in Swedan Shameh (Table 11 and Figure 20).

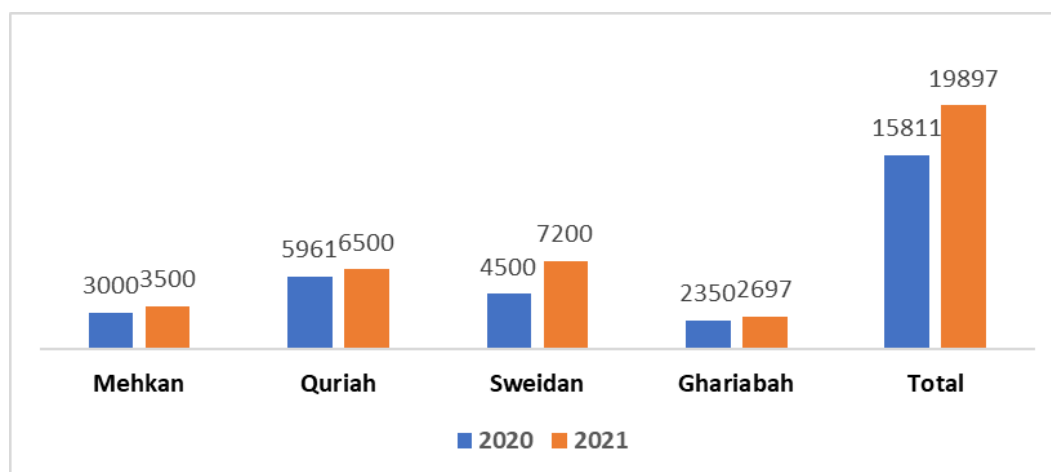
This translated into an increase in the number of schools in these villages where an additional 10 schools were rehabilitated in all four villages with the support of the community (Table 12).

**Table 11: Number of students in Sector 5 target villages (2020-2021)**

Village	2020	2021	Student population increase (%)
Mahkan	3,000	3,500	14
Quriyeh	5,961	6,500	8
Swedan Shameh	4,500	7,200	37.5
Gharibeh	2,350	2,697	13
<b>Total</b>	<b>15,811</b>	<b>19,897</b>	<b>20.5</b>

Source: Ministry of Local Administration, Deir-ez-Zor Municipality, 2021

**Figure 20: Total number of students in Sector 5 target villages (2020-2021)**



Source: Ministry of Local Administration, Deir-ez-Zor Municipality, 2021

**Table 12: Number of schools in Sector 5 target villages (2020-2021)**

Village	2020	2021
Mahkan	8	10
Quriyeh	18	19
Swedan Shameh	6	10
Gharibeh	7	10
<b>Total</b>	<b>39</b>	<b>49</b>

Source: Ministry of Local Administration, Deir-ez-Zor Municipality, 2021

Girls benefited from the increased activity and population in the villages which brought more security to the villages, which made it safe for girls to go to schools again and resume their education. Also, with the increased sense of

stability, families started to report reduced interest in early marriage which was resorted to as a way to keep their girls safe and provided for.

**Highlights:**

- The increased crop production created a ripple effect in the local markets of Al-Mayadeen and Al-Eshara, where trading agricultural commodities took place, resulting in an increase in number of agricultural traders and commission dealers (Dalal).
- Secondary jobs as produce shop keepers and produce processing jobs for female farmers also experienced an increase in addition to other commercial and trading related jobs e.g. regular shop keepers, porters, carriage drivers and even coffee shop waiters.
- Sector 5 attracted other investments in the area namely by UNICEF and OXFAM.
- The total number of population in Sector 5 target villages increased by 10,335 persons (2,550 families) who returned to their villages to participate in the growing agricultural activity in the sector and start their own livelihood activities.
- The increase in population was accompanied by an increase in the number of school age children, where the total number increased by more than 4,000 students in 2021 compared to 2020, with the largest increase being in Swedan Shameh village. In return the community invested in rehabilitating 10 schools to accommodate the increase in student population.
- Girls benefited from the increased security brought by the project making it safe for girls to go to schools and receive education. Also, with the increased sense of stability, families started to report reduced interest in early marriage.

# RECOMMENDATIONS AND LESSONS LEARNED

## I. Community asset rehabilitation is key for early recovery in post-crisis communities

Livelihood strategies that focus on the rehabilitation of assets targeting entire communities rather than individual households have a greater chance of achieving positive externalities and spill over effects beyond primary beneficiaries. Moreover, the rehabilitation of community assets ensures that no one will be left behind from the local communities. Projects such as Sector 5 can have a powerful and far-reaching impact on communities during a period of early recovery.

Rehabilitation and improvement of irrigation infrastructure in Sector 5 was critical for restoring agricultural production and strengthening farmers' resilience to achieve reasonable levels of socio-economic stability. Additionally, this project was vital for enhancing the protection of natural resources and sustaining agricultural practices in the area. Several projects are planned in the region as a result of the Sector 5 water system rehabilitation, including increasing the agricultural

plan for wheat, as a food security policy, and adding areas of barley and maize production.

Hence, it is recommended to work on the rehabilitation of strategic community assets as a driving factor for early recovery. The rehabilitation should be combined with complementary activities that help food insecure and vulnerable households to resume their activities as well.

In addition, it is critical to budget for agricultural inputs, other than water, namely seeds and fertilizers, when planning similar projects in the future as this is critical to ensure the effectiveness and sustainability of the investment. Such high cost can create barriers to cultivation of the land for small holder farmers, and ultimately affect the prices of the agricultural products in the local markets, resulting in limited access to food in the targeted community.

## II. Coordination with local authorities is critical for efficient implementation and long-term sustainability of community asset rehabilitation projects

In similar future projects, it is advised that the rehabilitation of the whole drainage system proceeds in parallel with the rehabilitation of the irrigation system to ensure sustainable use of the natural resources namely: land and water.

Additionally, WFP should continue strengthening coordination with cooperating partners and service providers in order to leverage technical expertise and maximize the comparative advantage of each.

Local institutions need support and technical assistance to sustain key infrastructure of the irrigation system. WFP should work with national, governorate and local officials to ensure that other critical systems, such as electricity supply, are in place to support these types of rehabilitation projects. Training should also be provided for community-based management skills – including funds management for future maintenance works.

## III. A focus on women farmers is key in agriculture-based livelihood programming

Sector 5 showed that female farmers are willing to grow into new roles as farm owners, shop owners, and market traders but continue to lag behind their male counterparts in food security and access to livelihood opportunities. When they have been able to access these opportunities, their participation into these new roles have helped them lower their livelihood and consumption based coping strategies, thus improving their household food security situation. This highlights the importance of targeting

female farmers and building their capacity to improve their ability to participate in the agricultural workforce, in future communal asset rehabilitation projects. It is noteworthy that village of Ghreibah had the highest population of female farmers and hence, it would be recommended to be the target for future programming focused on female farmers. Moreover, the village had the lowest access to irrigation water and hence needs more support in improving agricultural productivity.



#### IV. Aligning capacity building to farmers areas of expertise and interest

Interviewed farmers expressed their interest in continued capacity building in water management. This can be also opportune to relay to the farmers the importance of adherence to irrigation schedules and its ramifications on other farming priorities.

In addition, the results discussed above showed that different villages have different strengths and experience with respect to different agricultural activities.

For instance, Swedan Shameh and AlKouria were leading on wheat farming and intensive farming in general whereas, Gharibeh had the highest production for summer crops. On the other hand, Mahkan was the leading village on livestock keeping. Accordingly, future support and capacity building should be tailored to focus on these areas to help different villages diversify their activities while capitalizing on their competitive advantages.

#### V. Understanding the larger ecosystem for agriculture-based livelihood programming to ensure long-term impacts on food security in targeted communities

The relation between providing inputs for agricultural productivity, and subsequent increase in productivity of seasonal crops does not directly translate to reduction in food prices and an increase in food accessibility in local markets for targeted communities. Hence it is critical to

understand and dissect the multiple confounders that contribute to the observed impact on food security for targeted communities to ensure effective programming in the future and integrating multiple stakeholders in the process.

# ANNEX 1: SOURCES OF DATA

## A. Primary data sources

Primary data sources were relied on mixed methodology and tools, following is the list of the data collection activities conducted:

- 45 Key Informant Interviews (KII) with internal and external key stakeholders in Sector 5
- 16 Focus group discussions (FGD) with 227 small holder farmers (120 females and 107 males) conducted in the four targeted villages (Table i).
- 10 in-depth interviews (IDI) with small holder farmers and traders (Table ii).

- 123 surveys were collected from a convenient sample of beneficiaries from the four villages (Table iii)

Qualitative data collection started in August 2021 and continued for three weeks in all four villages. Later, qualitative data was analysed using an iterative and inductive approach in order to broaden the understanding of impacts on different stakeholder, both intended and unintended, and capture the types and complexity of processes leading to decisions and impacts (Pozarny, 2017)

**Table (i) Number of Focus Groups (FGs) conducted in Sector 5 target villages**

Village	No. of FG	No. FG participants		Total No. of participants
		Male HH Head	Female HH Head	
Mahkan	4	23	28	51
Quriyeh	4	22	27	49
Swedan Shameh	4	31	25	56
Gharibeh	4	31	40	71
<b>Total</b>	<b>16</b>	<b>107</b>	<b>120</b>	<b>127</b>

**Table (ii) Number of IDIs conducted in Sector 5**

Interviewee		Male	Female
Farmer	Resident	1	1
	Returnee	2	2
Trader		1	1
Casual Laborer		1	1
<b>Total</b>		<b>5</b>	<b>5</b>

Additional quantitative data was collected from a convenient sample of participants from all target villages from both male and female participants (Table (iii)). The survey was based on key observations derived from the qualitative data and focused on identifying how the

project affected beneficiaries' consumption and livelihood coping strategies as compared to prior the project completion. Also, it aimed to identify factors contributing to beneficiaries' access to food as well as the challenges they continue to face.

**Table (iii) Number of surveys collected in Sector 5**

Village	Female	Male	Total
Mahkan	22	11	33
Quriyeh	16	26	42
Swedan Shameh	15	9	24
Gharibeh	12	12	24
<b>Total</b>	<b>65</b>	<b>58</b>	<b>123</b>

## B. Secondary data sources:

The following sources of data were analysed as part of this review:

- General Corporation for Land Reclamation (GOLD), 2021
- Ministry of Agriculture and Agrarian Reform (MAAR), 2021
- Ministry of Local Administration, Deir-ez-Zor Municipality, 2021
- Ministry of Water Resources (MOWR), 2021

The data from the above sources both primary and secondary were analysed in line with the key research questions outlined in the inception report which addresses the effectiveness, efficiency, relevance, and impact of the project on the target population. The outcome of the data synthesis was summarized into 10 key results outlined under four main sections:

- **Section A:** Improved agricultural productivity and agricultural practices
- **Section B:** Improved livelihood and women economic empowerment
- **Section C:** Project timeliness efficiency and alignment to community needs
- **Section D:** Overall impact on Sector 5 community

These results will be discussed in the following section of the report, followed by the key recommendations and lessons learned.

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