4D 74, 54–63. (2024)

DOI: HTTPS://DOI.ORG/10.36249/4D.74.5954

ALKALMAZKODÁS A BIZONYTALANSÁGHOZ: MEZŐGAZDASÁGI GYAKORLATOK ÉS POLITIKÁK AZ GHAB-SÍKSÁGON, SZÍRIÁBAN

ADAPTING TO UNCERTAINTY: AGRICULTURAL PRACTICES AND POLICIES IN GHAB PLAIN, SYRIA

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ABSZTRAKT

A szíriai Ghab-síkság, amely történelmileg jelentős mezőgazdasági régió Szíriában, 2011 óta mélyreható kihívásokkal szembesült a folyamatos konfliktus következtében. Ez a tanulmány a Ghab jelenlegi mezőgazdasági termelésének állapotát vizsgálja, és elemzi, hogy a vidéki megélhetés hogyan alkalmazkodott a szíriai konfliktus által okozott társadalmi-gazdasági és környezeti zavarokhoz. Esettanulmányok segítségével, a régió mezőgazdasági szövetkezeteiben tevékenykedő hét, kulcsfontosságú interjúalannyal készült, félig strukturált interjúk során gyűjtött adatokat dolgoz fel. A kutatás rámutat a mezőgazdasági ágazat hanyatlására, amelynek fő okai a sérült öntözési infrastruktúra, a növekvő termelési költségek és az elégtelen kormányzati támogatás. Ennek következtében sok gazda áttért a kisüzemi gazdálkodásra, amely a háztartási önellátásra, a növénytermesztés diverzifikálására és a háziállattartásra összpontosít. A tanulmány szerint a Ghab mezőgazdasági ellenálló képességének fokozása érdekében elő kell segíteni az organikus trágyák használatát, növelni kell a helyi takarmánytermelést, és be kell vezetni a szerződéses gazdálkodást. Az öntözési infrastruktúra helyreállítása szintén kritikus fontosságú. Ezek az eredmények rávilágítanak a vidéki közösségek ellenálló képességére a nehézségekkel szemben, és betekintést nyújtanak azokba a szakpolitikai intézkedésekbe, amelyek támogathatják Szíria mezőgazdasági szektorának helyreállítását. További összehasonlító tanulmányokra van szükség Szíria különböző régióiban, hogy teljes mértékben megértsük a konfliktus mezőgazdaságra gyakorolt eltérő hatásait.

Kulcsszavak: mezőgazdasági ellenálló képesség, vidéki megélhetés, szerződéses gazdálkodás, Ghab síkság, Szíria

ABSTRACT

Ghab Plain is a historically important agricultural region in Syria. Since 2011, the Syrian crisis has impacted its agricultural productivity, and worsened socio-economic conditions. This study investigates the current state of agricultural production in Ghab and examines how rural livelihoods have adapted to the socio-economic and environmental disruptions caused by the Syrian crisis. Using a case study approach, data were collected through semi-structured interviews with seven key informants from agricultural cooperatives in the region. The research highlights the decline of the agricultural sector primarily due to damaged irrigation infrastructure, escalating production costs, and insufficient government support. In response, many farmers have shifted to small-scale farming focused on household self-sufficiency, diversifying crop production, and raising domestic livestock. The study suggests that enhancing agricultural resilience in Ghab requires promoting organic fertilizers, increasing local feed production, and implementing contract farming. The rehabilitation of irrigation infrastructure is also critical. These findings underscore the resilience of rural communities in the face of adversity and offer insights into policy measures that could support the recovery of Syria's agricultural sector. Further comparative studies across different Syrian regions are needed to fully understand the varying impacts of the conflict on agriculture.

Keywords: agricultural resilience, rural livelihoods, Contract farming, Ghab Plain, Syria

1- INTRODUCTION

Ghab Plain is a fertile and expansive flat plain located within the triangle formed by the provinces of Hama, Idlib, and Latakia. It is intersected by the Orontes River. The Plain has been the focus of significant government interventions. In 1952, Ghab Project Administration conducted the necessary studies regarding draining the Ghab swamp [1]. After reclamation, the newly acquired lands were distributed based on a socio-economic plan as outlined in the Agricultural Reform Law of 1969, with an average allocation of 2.5 hectares per households. Large irrigation networks were also constructed and became the primary source of irrigation water for the newly established agricultural system which was complemented by the establishment of agricultural cooperative associations [2].

The onset of the Syrian crisis in 2011 was driven by various factors such as the complexity of the political and social structure, as well as multilateral foreign and regional factors. The crisis has adversely affected the agriculture sector in Syria, leading to changes in land use patterns and a reduction in agricultural production. Rural life has unquestionably come under significant security pressure during the Syrian crisis. The crisis resulted in the destruction of a significant proportion of villages in Ghab Plain. Even though, a considerable part of the population remained in other villages, agricultural production declined, and the nature of this production underwent significant changes [4].

Several studies have been conducted to understand agriculture development processes in the region. Hamade [5] demonstrated that the Ghab region in Syria is experiencing over-exploitation of groundwater aquifers due to increased agricultural development and population growth. Khadrah [6] discussed the decline of cotton cultivation and the expansion of wheat cultivation in the Ghab zone between 2005 and 2013. The main reasons for this shift were the lack of proportionality between the price and production costs of cotton, and the rise in the price of diesel, a key factor in cotton cultivation. Ciaschini [7] analysed economic policies for improving female labour participation and food security in the Ghab region of Syria.

This study aims to address some knowledge gaps. Firstly, there is lack of socio-economic studies that focus on the rural community in Syria, particularly after the onset of the crisis in 2011. Secondly, Ghab Plain gained more significance after the outbreak of the crisis, particularly in its contribution to the agricultural production sector in Syria. Therefore, the goal of this study is to improve the comprehension of the economic and social conditions in the region and assess the effectiveness of agricultural policies. Furthermore, this study aims to discuss the adaptation processes that have taken place during the Syrian crisis and the prospects for resilience. To address these knowledge gaps, this study explores the following research question: What is the current state of agriculture in Ghab Plain, and how do those living in rural areas adapt to the changes that have occurred during the Syrian crisis concerning agricultural policies and economic decline? The study investigates this topic through interviews with seven key individuals belonging to agricultural cooperatives in Ghab Plain.

2- STUDY AREA

Ghab Plain is considered one of the most important agricultural regions in Syria due to its fertile soil and the diversity of its water sources. the plain extends for approximately 80 kilometres in length and 10–20 kilometres in width, covering 141,000 hectares and with an estimated population of around 300,000 people [1], [2]. The region is bounded to the west by the coastal mountain range, with heights reaching up to 1500 meters, with an elevation of 600 meters (Fig. 2). The city of Jisr al-Shughur lies to the north, and to the south is the plateau of

Masyaf [8]. With an elevation ranging from 150 to 180 meters above sea level (Fig. 2). Ghab Plain is traversed by the Orontes River, and is endowed with numerous springs on its eastern and western edges (Fig. 1). The annual precipitation rates vary between 350 and 1200 mm, with the highest rainfall rate typically observed in the western part near the coastal mountain range, and decreasing further eastward and southward within the plain [1], [2], [3].

3- METHODOLOGICAL APPROACH:

To investigate how farmers in Ghab Plain have adapted to changes in agricultural policies and economic decline during the Syrian war, seven in-depth, semi-structured interviews were conducted with key individuals belonging to agricultural cooperatives in Ghab Plain. An interpretive, constructionist approach was employed to analyse interviewees' experiences, opinions, and perceptions of reality [9]. A case study methodology was chosen to facilitate detailed analysis of the changes in agricultural policies and economic conditions [10]. This study utilized purposive and snowball sampling techniques [9]. The interviewees were selected through outreach with the general authority for Ghab Plain management and the general union of peasants (Agricultural Cooperatives in Ghab Plain), and by snowball sampling by asking interviewees to suggest other possible ones.

Seven open-ended questions served as guidelines for the semi-structured interviews [9]. The interviewees were provided with the following questions before the interview:

1. How has the social and community situation in Ghab Plain changed from 2010 to 2023?
2. What crops and livestock do you manage, and how has your agricultural production changed during the conflict?
3. What farming practices have you modified in the past five years, and why?
4. What are the current challenges on your farm?
5. How would you describe the implementation of agricultural and irrigation policies in Ghab Plain?
6. How have environmental factors and climate variations influenced agriculture in Ghab Plain?
7. What recommendations do you have for improving agricultural resilience amidst economic decline?

Interviews, conducted face-to-face in Arabic in July and August 2023, lasted 25–60 minutes and were audio-recorded. Transcripts were coded, and thematic analysis was applied to identify key concepts and insights, with direct quotations included to support findings. Data saturation was typically achieved after six or seven interviews, as per the ≤5% new information threshold [11]. Secondary data from the Central Bureau of Statistics and the Ministry of Agriculture supplemented the analysis, providing additional context on agricultural changes in Ghab Plain.

4- RESULTS AND DISCUSSION:

The main subjects and topics discussed by the interviewees will be presented in four main sections regarding to the community conditions, economic challenges, adaptation processes and resilience prospects, respectively. No personal details are included. Most of the interviewees are second or third-generation farmers after the establishment of Ghab agriculture system in 1959, with ages ranging from their 40s to their 60s.

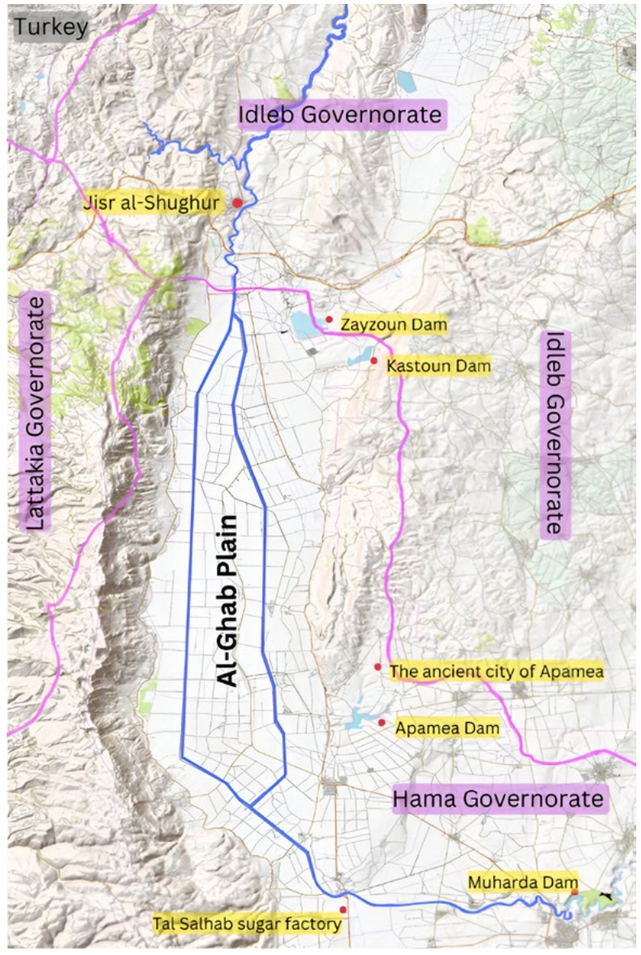
4-1- Community conditions and living expenses:

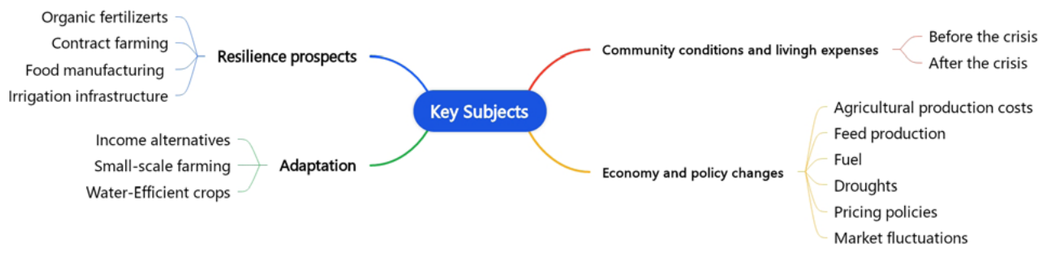
Like other rural regions in Syria, Ghab Plain experienced a sustained period of stability before the Syrian crisis. With agriculture serving as a major contributor to the income of the rural community, the substantial agricultural support provided by the government was the principal factor underlying the prosperity of agriculture in the plain as in all rural Syria [12]. Nevertheless, despite agriculture being a substantial source of income for the Ghab Plain community, there was a clear trend towards urbanization. The non-agricultural income sources were enticing for many who left their villages and headed to the city in search of employment due to Syria's economic stability and the general improvement in wages and salaries. This trend became especially conspicuous during the three-year drought period from 2008 to 2010 [13], leading to tens of thousands of people migrating to urban areas in pursuit of appealing job opportunities [14].

With the onset of the crisis in Syria, social conditions began to change dramatically. Ghab Plain, which is characterized by its social and religious diversity and strategic location, connecting the Syrian coast with the interior through a series of coastal mountains, became a contested area during the war. The inhabitants experienced a lack of security and stability, leading to significant societal transformations. Many locals actively participated in the war, primarily to defend their villages and homes, while others relocated to safer areas, one of the interviewees says *"The onset of the first attacks in Jisr Al-Shughur in the western Idlib countryside led to a complete change in the situation in all villages in Ghab Plain. You know, how things went on that side of the plain. Popular committees were formed in each village with government support, and many young men joined fighting camps based on their religious and ethnic affiliations"*.

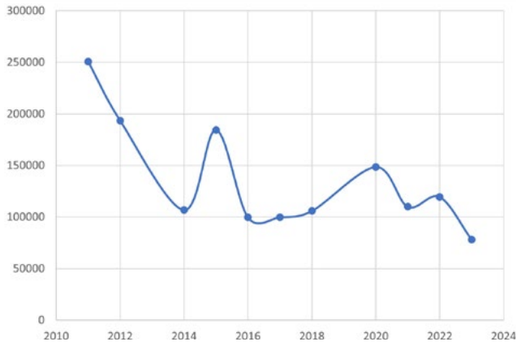
The instability in Ghab Plain led to several difficulties, including transportation disruptions, the inability to access agricultural lands, and occasional interruptions in education due to the inability to reach schools.

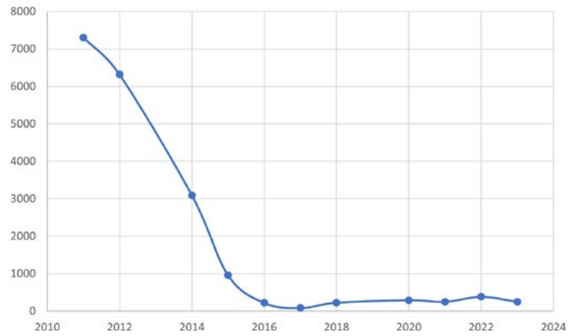
Fig. 1: Al-Ghab plain map with Orontes River stream Channels through the plain
BASE MAP WAS SOURCED FROM OPENSTREETMAP.ORG
Fig. 2: Digital Elevation Model for AL-Ghab Plain. SRTMGL1_NC.003_SRTMGL1_DEM
HTTPS://APPEEARS.EARTHDATACLOUD.NASA.GOV/
Fig. 3: Summary of interview results into four key subjects, and specific topics discussed by the interviewees

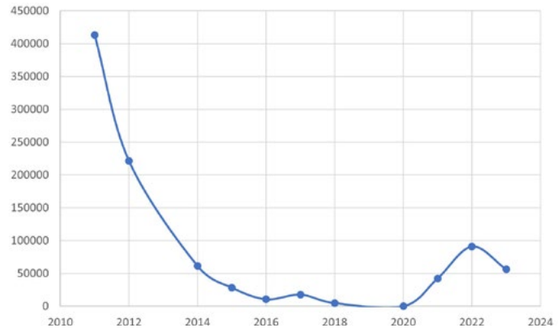




◂◂**Fig. 4:** Wheat production (tons) in Al-Ghab Plain (2011-2023) [21]
◂◂**Fig. 5:** Cotton cultivated area (ha) in Al-Ghab Plain (2011-2023)
Fig. 6: Sugarbeet production (tons) in Al-Ghab Plain (2011-2023) [21]







As detailed by one of the interviewees *"Agricultural production in Ghab Plain declined significantly during the Syrian war and getting produce to the market was sometimes extremely challenging due to the chaos that accompanied the conflict. not always due to the war itself, but because of the chaos that accompanied the conflict, including incidents of road blockades and theft at certain stages."* However, the economic conditions for the population were not extremely poor in terms of income, food availability, and cost of living, even though the latter did rise because of the war. Nevertheless, this increase was gradual until the end of 2019 [15].

Rural families, both poor and relatively affluent, have turned to agriculture to secure food and combat the decline in living standards due to the depreciation of the Syrian currency, and the decrease in salaries and non-agricultural sources of income due to inflation[16]. One interviewee states: *"Despite the war, the cost of living was much cheaper than the current situation, and there was no hunger. Even from an agricultural perspective, all agricultural requirements were available. During 2018 and 2019, it was believed that the war had ended and the situation in the country would improve, but no one knew what was coming."*

After years of militarization, volatility, and insecurity, and after many attempts to calm the situation, a long-term ceasefire agreement was reached between the government and the military opposition forces stationed in Idlib in the fall of 2019. This led to an improved sense of security and stability in the villages of the plain, positively influencing lifestyle patterns and the agricultural sector. However, it did not take long before a sharp economic downturn occurred at the beginning of 2020 due to the spread of the COVID-19 pandemic and international sanctions, especially the Caesar Act, on Syria [17]. In addition, the Syrian economy was affected by the financial crisis in Lebanon in August 2019 and the bankruptcy of Lebanese banks, which were a major means of transferring money between Syria and other countries in light of the international isolation of Syria. The crisis in Lebanon contributed to the decline in the value of the Syrian pound and the rise in prices of goods and services in Syria [18].

Despite the abatement of the military conflict, the economic situation has not improved, and the poverty rate continues to rise, alongside a significant drop in the exchange rate and the country's transformation into an importer of basic goods in the worst economic crisis in recent history, as reported by UNICEF [19]. Social changes have also developed in an unexpected direction. In the past, getting a public sector job was a dream, but now government jobs are not desirable due to the low wages.

On the other hand, agriculture has become more important and necessary for earning a living. Many people in rural areas have turned away from education and prefer to search for any work that can help them earn money, such as daily wage agricultural work or professional work. As one of the interviewees explained *"Nowadays, everyone is farming in whatever available space they can find, not with the goal of selling the produce for profit but primarily to have food to eat. The exchange rate is tragic, which means that there is no point in pursuing an education when your future job will not even cover the cost of feeding your family."* Since then, a new and different hardship emerged in Ghab Plain, characterized by rising living costs, agricultural production challenges, and the availability of production necessities, in addition to the challenges of agricultural and support policies.

4-2- Economy and policy challenges:

Ghab Plain has 87,000 hectares of arable land available for agricultural investment. Out of this, 79,220 hectares are irrigated, with 59,955 hectares being irrigated through government-run irrigation networks and 19,265 hectares through wells [21].

One of the unique features of Ghab Plain was the high percentage of strategic crops in the overall crop composition. **Wheat, cotton,** and **sugar beet** were grown on 86% of the cultivated land in the agricultural system. Sugar beet held relatively high national importance, as it was grown on more than 11% of the cultivated land and represented more than 33% of the total cultivated area before the crisis. Additionally, the region contributed to cotton production to a lesser extent, with cotton being cultivated on 14% of Ghab arable land [3]. However, statistics from the Ministry of Agriculture and Agricultural Reform reveal a substantial decrease in Ghab Plain's agricultural production, pointing towards a decline in the output of most crops, and specifically these three strategic crops (Figures 4, 5, and 6) [21].

During the war in Syria, the lack of effective enforcement of legal regulations and the prevailing chaotic conditions led to the looting, vandalism, and damaging of many pumping stations, irrigation canals, and dams. The crisis affected the infrastructure of irrigation canals that are the cornerstone of agriculture in the plain: five dams and collection points were subject to demolition and destruction in the plain. According to Haj Asaad [4], the water volume flowing in the Ghab Plain network fell from an annual rate of 1.5 billion cubic meters to 0.5 billion cubic meters.

In 2019, a rapid economic decline meant that farmers in Ghab Plain faced high production costs, while the cost of diesel soared, making it more expensive to operate diesel-powered pumps to irrigate crops. In addition, the high prices have also led to a lack of quality inputs for farmers in the Ghab Plain. This includes a lack of quality seeds, fertilizers, feed, and other inputs that are necessary for successful crop production. Climatic conditions and water availability significantly influenced wheat cultivation, especially in the 2014, 2020 and 2021 seasons. This is due to the fact that a substantial amount of wheat farming relies on rainfall, making it a key factor in yield determination [20].

Regarding the climatic conditions, one of the interviewees notes: *"During the war, there was a period of drought that required us to use four diesel pumping engines to transfer irrigation water from one source to another four times to reach our fields. Despite the challenging circumstances, we were able to do this at a low cost and even gained a profit."* The Ministry of Agriculture determines the prices of strategic crops before each season. This pricing strategy is supposed to guarantee farmers a profit and to maintain steady production. Regrettably, the substantial inflation of recent years has disrupted this stability. All interviewees state that the government's pricing is unjust, causing numerous farmers to avoid delivering their wheat production to the governmental institutions. As explained by one of the interviewees *"The expense of producing wheat is significantly high when compared to the set price. This discrepancy is particularly noticeable as the pricing is determined based on the average yield per area, which is often overestimated compared to the actual yield."*

As for cotton and sugar beet, which are solely marketed to state institutions, this pricing policy holds greater importance and serves as a crucial factor in determining whether farmers decide to grow these crops. Cotton production has experienced a sharp decline since the onset of the crisis in Syria, especially in Ghab Plain [21]. The primary cause of this decline is the inadequate availability of water resources for irrigation, since cotton requires a significant amount of water. On the other hand, Ghab Plain in Syria was a significant contributor to the

nation's sugar beet production, accounting for about a third of the total cultivated area. Tal Salhab sugar factory, located in the Ghab Plain, ceased sugar production in 2014 and instead began supplying sugar beet as feed to the General Fodder Corporation. In the 2016, 2017, and 2018 seasons, the plain was the only agricultural system in Syria where sugar beet was cultivated.

With the beginning of the **economic collapse** in 2020, the increase in the cost of imports, and the shortage of foreign currency, the government tried to encourage the return of sugar beet cultivation. The purchasing price was raised, and Tal Salhab factory resumed operations in the 2022 season. However, the revival was short-lived due to high operating costs, as well as the poor quality of the crop supplied to the factory due to adverse weather conditions that caused fungal diseases. During the 2023 season, the persistent inflation and delayed payments compelled many farmers to sell their crops directly to sheep farmers. As one interviewee explained *"Currently, sugar beet farmers are experiencing the biggest losses in their history. The transportation costs of the crop are high, and the reception of the crop at the factory is very slow. However, sheep farmers have a favorable opportunity to purchase the crop directly from the farmers at a price of 500 SP as feed. This is a better option for them since the price of a kilogram of hay, which they usually rely on, is 800 SP."*

Similarly, when discussing **fuel,** it is worth noting that the Syrian government has lost access to its oil resources, except for a portion of natural gas. Currently, Syria relies on imports from other countries to meet its fuel and oil derivative needs. The surge in fuel prices has led to a comprehensive increase in the cost of production necessities, including the operation of agricultural machinery used in farming, land preparation, harvesting, and transporting produce to the market, as well as the cost of pumping irrigation water [22]. The issue is not limited to price increases, but also extends to the reduction of allocations distributed by government entities. A new struggle has emerged concerning the adequacy of allocated quantities, and securing them has become a major challenge for farmers, threatening their ability to continue the production process. This has forced many farmers to purchase fuel at parallel free-market prices. Agricultural materials, like fuel, are procured through imports, which is reflected in their prices and the quantities available for subsidies, particularly in light of the depreciation of the Syrian pound.

The livestock industry has been severely impacted by inflation and the surge in prices. Numerous animal feed production facilities have been forced to cease operations due to the prohibitive costs of fuel. This has led to a significant reduction in the production of local feed, forcing livestock breeders to resort to more costly imported alternatives. Consequently, many breeders have suffered financial losses. As one of the interviewees states *"There is a significant disparity between the cost of animal feed and the market prices for milk. This discrepancy has forced many dairy farmers to sell their cows due to the high cost of concentrated feed."*

The absence of favorable **market conditions** is another issue that arises for many crops. This is mainly due to the lack of proper price regulation, which has made prices vulnerable to market fluctuations and supply and demand dynamics. As a result, farmers feel insecure, which has negatively impacted production, continuity, and the quality of the crops they grow. In this context, the government is trying to allow exports in cases of surplus production of a certain crop, aiming to secure the sale of the surplus and ensure the profitability of the farmer. However, this policy raises market prices at a time when citizens are suffering from a decrease in living standards. As such, it is not an ideal policy under the current circumstances.

Taking the above information into account, the general timeline of the Syrian conflict can be categorized into three phases: The first phase, lasting from 2011 to 2016, was characterized by war and military operations as the primary factors leading to the decline in agricultural production. In the second phase, between 2016 and 2019, there were signs of returning economic stability as the Syrian pound remained relatively steady, fluctuating at approximately 500 pounds per dollar [18]. This stability was influenced by the limited intensity of the ongoing conflicts and consistent trade interactions with Lebanon [18], [19]. In the third phase, from late 2019 to the present, an economic downturn in Syria and Lebanon has become the predominant cause of agricultural decline.

4-3- Adaptation

Farmers across Syria have been grappling with numerous economic and security challenges that have significantly reduced their productive capacity. Two of the interviewees mentioned *"In order to adapt to the difficult circumstances, many of farmers in Ghab Plain have shifted their focus towards wheat cultivation, as it serves as a fundamental food source under the current conditions. Additionally, wheat also provides straw, which is essential for livestock rearing."*

In the sugar beet season of 2022 and 2023, many farmers planted it in response to government incentives and in the hope that the sugar factory in Ghab Plain would resume operations after a seven-year hiatus. Unfortunately, as previously mentioned, these expectations were not realized, leading to significant losses for the farmers. One interviewee pointed out that the same situation occurred with lettuce, carrots, garlic, potatoes, and other crops. This was due to market instability in abundant seasons when prices were left to the forces of supply and demand, leading to a significant price drop. Consequently, farmers suffered losses, which led them to either stop producing these crops or reduce the planted areas as a reaction. However, their cessation of production later resulted in a price increase for these crops in the following season.

In the context of adaptation, it is worth focusing on methods to mitigate the negative impact of poverty. Regarding the current conditions, in which Syria's population is suffering from deprivation and a decline in living standards, the rural population may be fortunate because they have the opportunity to secure some income alternatives and adjust their livelihoods due to their proximity to nature and access to additional resources that city dwellers cannot obtain. For this reason, numerous rural households are striving to enhance their farming practices and diversify their crop cultivation with the aim of maximizing production to help meet their food needs either entirely or partially, from the vegetables and crops they can produce.

Given the loss of extensive agricultural production due to high costs and water scarcity, numerous families are turning to **small-scale farming.** They are planting a variety of crops in smaller areas to ensure their basic needs are met from their own yield, and then they sell any excess produce. This is a particularly common strategy among those who do not have sufficient access to water for large-scale production. One interviewee elucidates this: *"A farmer who suffers a loss in one season will not farm in the same way the next season because his expectations will be lower. He will cultivate a smaller area or perhaps shift to another crop."* Another interviewee notes: *"Except for wheat, farmers cannot produce on large scales under the current conditions. Many cannot bear the burdens of irrigation and fertilization."*

Therefore, many have had to change their lifestyle and adopt a new method based on what we may call family self-sufficiency, where they strive to secure as much as possible of their food requirements by working on their land. We discussed this point with the interviewees, and they expressed similar opinions despite their differing ages and social positions. *"We are all poor now regardless of the previous financial situation, except for the rich who have other sources of income such as trade or those who own wealth through inheritance"* one of the interviewees commented.

On the other hand, the lack of water and the high cost of water pumping have led many farmers to plant **water-efficient crops,** such as legumes, which also do not require much fertilization. The assumed strategy also includes a shift towards raising domestic poultry for self-sufficiency in eggs and chicken meat, which is an additional relative advantage for rural residents compared to city dwellers.

In addition to **domestic poultry,** many rural families strive to own one or two dairy cows, as it is not difficult to secure feed for them and they can meet the family's milk needs, while also retaining the possibility of selling any surplus. Here, we recall the Syrian rural population's view of a steady job before the crisis, which was a dream for the majority. But under the current circumstances, the dream has changed and perhaps now revolves around owning a dairy cow. This is not only because it has become more viable than a job, but also because it gives rural families a sense of income security. In fact, a clear change can be diagnosed in the rural community from this perspective. Rural residents feel distinguished from city dwellers who have become less capable of easily securing such resources as milk, eggs, and vegetables. Furthermore, many farmers are venturing into beekeeping as an additional source of income with relatively low costs. On a related note, the reduction in heating allowances from subsidized diesel has led to a bigger problem for city residents than for rural residents who have been relying on alternatives such as tree branches, pruning residues and firewood operations, or even buying firewood, which is cheaper than diesel.

These and other adaptive methods are being adopted by rural families in Ghab Plain to alleviate the burdens of life in the current situation. These methods may be similar to those in the rest of rural Syria, except for differences in climate, which consequently leads to variations in the resources that rural people strive to exploit to the maximum possible extent. This raises the question about the abundance and resilience of these resources in the future. This issue may be important particularly in rural areas where residents rely on gathering wild medicinal and aromatic plants as a source of livelihood.

4-4- Resilience prospects

In the context of discussing the potential for resilience, it is important to consider the exploration of alternatives to costly agricultural inputs, particularly those that are imported. **Organic fertilizers** are a cost-effective alternative to traditional mineral-based fertilizers [23]. By using animal manure, farmers can create fermented organic compost, which not only significantly improves the quality of the soil but also provides a balanced supply of essential nutrients for plant growth. In the villages of Ghab, local compost is viewed as a valuable resource. Often, farmers who do not have their own livestock purchase this compost as a cost-effective substitute for the more expensive traditional fertilizers. This suggests that organic fertilizer production units could be beneficial, since they offer various organic combinations of the essential plant nutrition elements. These fertilizers would help maintain soil organic matter levels and promote microbial activity within the soil.

On the other hand, the concern about the high cost of imported feed for livestock owners is indeed significant. Therefore, securing local alternatives is crucial to alleviate these burdens and costs. The Ministry of Agriculture is striving to reduce dependence on imports by incentivizing the expansion of cultivated areas for certain fundamental fodder crops like yellow corn. This is facilitated by the ministry's strategy of establishing a high purchase price for these crops, as set by the General Establishment for Fodder.

Indeed, the production of this crop in the 2022 season increased to approximately 500,000 tons at a national level [24]. Regrettably, the circumstances did not progress as the farmers had hoped: they were looking forward to significant profits after the Ministry of Agriculture's promises. The issue is that yellow corn is typically quite moist when harvested, and requires a drying process. However, due to the war, the public sector struggled with a lack of drying equipment. This has led to the responsibility of drying being shifted onto the producers, creating substantial difficulties for them.

It is evident from the last point that farmers face a fundamental issue, which is uncertainty about profits due to the poor management. One potential solution might be found in implementing **contract farming,** which is a partnership model between producers and buyers [25]. In this model, the buyer enters a contract with farmers to produce a specific quantity of a crop with certain specifications, often including a fixed purchase price in the contract [25], [26]. This arrangement can offer farmers a guarantee of income and mitigate market risks, besides providing production necessities, guidance, and financing. It aids in minimizing intermediation between farmers and buyers, while also acting as a mechanism for enhancing marketing, supports producers in accessing markets, and offers a solution to market challenges [25].

The government has made efforts to ease the conditions for agricultural investments by providing tax and customs exemptions, as established in Investment Law No. 18 of 2021 [27]. This law provides a perpetual tax exemption amounting to 100% of income tax for projects involved in agricultural and animal production manufacturing, as well as for agricultural marketing companies that are involved in sorting and packaging agricultural products. When discussing **agricultural manufacturing,** it is arguably of paramount importance. By utilizing food product manufacturing facilities, it is possible to accommodate surplus production. This approach can help mitigate marketing challenges, stabilize the market, and foster greater stability.

Undoubtedly, for Ghab Plain, water resources are vital for expanding the cultivated area and enhancing irrigated production. The repair of pumping stations and the restoration of war-damaged dams should perhaps be prioritized. There are three reservoirs that remain outside the government's control on the northern fringes of the plain, adjacent to Idlib. The Ministry of Water Resources is undertaking the rehabilitation of the Apamea water project that irrigates 6,500 hectares. The rehabilitation has resulted in the reclamation of 3,000 hectares from this area in the agricultural plan for 2024 [28].

Given the limited resources, this rehabilitation effort is commendable but insufficient to restore agricultural production in the plain to its former levels. The total irrigated area in Syria declined by an average rate of –23%. Conversely, modern irrigation methods, particularly drip irrigation, increased by 25% in the second period [21]. This is primarily due to a water use rationing policy that provided interest-free loans to farmers who adopt these systems. This policy can be critical in the current circumstances of water scarcity and infrastructure damage.

5- CONCLUSION

This study has explored the current state of agricultural production in the Ghab Plain of Syria and the ways in which rural livelihoods are adapting to changes during the Syrian conflict. The in-depth interviews with key participants revealed a significant decline of the agricultural system in Ghab Plain. Multiple factors have contributed to this decline, most notably damage to irrigation infrastructure during the conflict, increases in production costs, shortages of agricultural inputs, and inadequate government policies related to crop procurement prices. As a result, many farmers have shifted to smaller-scale cultivation of diverse crops for household self-sufficiency and raising domestic livestock like poultry and dairy cows. To enhance the resilience of agriculture in Ghab Plain, potential strategies include promoting organic fertilizers, increasing local production of animal feeds, implementing contract farming arrangements, and improving government price regulation. Repairing damaged irrigation infrastructure is also critically needed. This study demonstrates how the rural community in Ghab Plain is adapting agricultural livelihoods to mitigate the effects of economic hardship. It highlights the challenges faced by farmers and provides insights into policies that could enhance agricultural production. However, there is a need for further investigation. Comparable studies could be carried out in different farming regions of Syria, allowing for a comparison and differentiation of the problems and solutions identified in this case study. ⦿

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