



THE REALITY OF AGRICULTURAL EXTENSION ACTIVITIES IN THE NINEVEH PLAIN REGION POST LIBARATION (2017-2023)

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ABSTRACT

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The objective is to study the challenges of the agricultural sector including field crops, animal production, and extension in the Nineveh plains region after ISIS liberation. Nineveh Plains is considered the "breadbasket" of Iraq, and it is one of the most fertile plains in the country. In 2014, the Nineveh Plain territory was overtaken by the Islamic State of Iraq (ISIS). Close to one million people are estimated to have fled their homes, and at least 20,000 commercial and government buildings, including schools, animal projects, and training institutions, were destroyed. To achieve sustainable agriculture development the ideal use of natural, capital, human and technical resources is necessary. Through a cultural lens, strategies to improve the efficiency, effectiveness, and management of agricultural development are being explored. The overall objective of the study is to assess the livelihood of agricultural sub-sectors of rural communities, highlighting farmer needs for restoring agriculture and proposing culturally relevant interventions and solutions. This project strategically selected the districts of Al-Hamdaniya, Tilkaif, and Bashiqa to conduct interviews and needs assessments. Revolution in the agricultural sector can make it an engine of economic development. Post-conflict, agricultural expansion, and improved productivity may be achieved by focusing on agricultural promotion which includes improving the skills of farmers, the investment environment, irrigation, availability of data and information, and minimizing price distortions.

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INTRODUCTION

Various international organizations, such as the World Bank Group, the United Nations Development Program, and the Food and Agricultural Organization (FAO), have underscored the significance of agriculture and the food sector in facilitating rural job creation and income generation. These organizations have further emphasized that the aforementioned sectors have a profound impact on political and economic stability. According to Zhao *et al.*, (2007) research, sustainable agricultural development encompasses the sustainability of agricultural production and the rural economy, ecological and environmental sustainability within agricultural systems, and the sustainability of rural society. The significance of agriculture is paramount

for the well-being of humanity and the advancement of economies, encompassing both developed and developing nations. Nonetheless, it holds significant importance in nations where individuals continue to reside in dire poverty, relying primarily on subsistence farming for sustenance and financial support. In accordance with Uziak, and Lorencowicz (2017) findings, it is common for individuals in developing nations to rely on agriculture as their primary source of income. According to Abdulhaleem *et al.* (2018), the agriculture and food industry in Iraq is characterized by a significant reliance on labor, with the capacity to accommodate substantial labor inputs across the upstream (input supply and primary production), midstream (handling and processing), and downstream (distribution and marketing) segments of the value chain. Empirical evidence suggests that agricultural expansion plays a crucial role in mitigating poverty and generating employment opportunities, particularly among the impoverished rural population. Moreover, it is probable that enhanced allocation of resources within households through agricultural development will result in improved health and nutritional outcomes for children.

The Ninewa Plains region, comprising the Al Hamdaniya, TelKaif, and Shekhan districts, is renowned as the primary agricultural hub of Iraq, owing to its exceptional fertility. The revenue generated from the cultivation of wheat and barley during winter and fruits and vegetables during summer accounts for a significant proportion, ranging from 70 to 80 percent, of the total income earned by households residing in the Ninewa districts. Animal husbandry, which involves the rearing of livestock such as sheep and goats, constitutes approximately 20-25% of agricultural practices. The agricultural yield in the region is predominantly dependent on rainfall, as the climatic conditions and precipitation patterns are conducive to rainfed farming, accounting for approximately 95 percent of the total output. The region is renowned for the cultivation of leguminous crops, including chickpeas, lentils, sesame, yellow corn, and sunflower, alongside wheat and barley as primary agricultural products. According to Muhialdin (2021), the cereal crops grown alongside annual crops account for 45% of Iraq's overall production, earning it the moniker "basket of Iraqi bread".

The Ninewa Plains are home to a diverse array of Arab, Kurdish, and minority ethno-religious communities comprising its population. The interconnection between the histories of these groups and Iraq's political dynamics is profound, and their experiences have been impacted by prolonged periods of conflict and displacement. The Nineveh Plains region, situated between the city of Mosul, which is the second largest city in Iraq, and the Kurdistan Region of Iraq, was seized by the Islamic State of Iraq (IS) in the year 2014. The displacement of nearly one million individuals and the destruction of a minimum of 20,000 commercial and government structures, such as educational facilities, animal projects, and training institutions, have been approximated in the region. The predominant demographic of individuals who have been displaced comprises of ethnic and religious minority groups who are deemed to be vulnerable, such as the Yezidi, Christians, and the Shabak people. IS has specifically targeted civilians from certain communities due to their religious beliefs. According to a report by Unido in 2019, IS engaged in a systematic destruction of farms, sabotage of wells and irrigation systems, deforestation, and theft of machinery and livestock, resulting in the elimination of the primary sources of livelihood for

affected communities. The adverse impact of IS occupation on the communal harmony and coexistence of diverse communities in Ninewa Plains is intricately linked to the destruction of the social fabric. However, assessing this damage is considerably challenging. Animal husbandry was a significant economic activity for several communities, which suffered severe setbacks due to the occupation. The industry faced immense losses of livestock, as animals were either stolen, slaughtered, or left behind. Livestock are utilized for animal sacrifice by several minority groups, and the resultant meat is frequently distributed among the community, especially those who are economically disadvantaged. The act of making sacrifices can serve as a means of fulfilling commitments made during periods of hardship and holds significant value in various significant festivities (Laser Pulse, 2021).

According to Annie and Faminow (2014), agricultural extension services serve as an intermediary between agricultural researchers and farmers who require solutions to problems encountered in their agricultural practices. The field of agricultural extension has played a pivotal role in the identification of challenges encountered by farmers. This involves the transfer of such challenges to scientific research centers for thorough investigations and the proposal of suitable solutions and recommendations. The authors of Saleh *et al.* (2015) propose an expanded role for agricultural extension services that encompasses all facets of agricultural production and rural life. This includes the provision of simplified guidance to rural women farmers and young individuals. The overarching aim of this analysis is to evaluate the current state of agricultural livelihood sub-sectors, namely field crops, poultry, and horticulture. Additionally, it aims to emphasize the essential value chains of agricultural products and requirements. Moreover, the identification of obstacles that impede agricultural development, including farmer education and training, agricultural data analysis, research and strategic planning, and agro-industrialization, is crucial. The primary focus will be on revitalizing and expanding the agricultural sector to enhance productivity, with emphasis on the priorities of agricultural promotion. The proposed measures for enhancing the agricultural sector include enhancing the proficiency of farmers, improving the investment climate for agriculture, augmenting irrigation facilities to facilitate agricultural production, rehabilitating and managing land, developing infrastructure for the agriculture industry, enhancing the accessibility of agriculture data and information, and reducing price distortions for agricultural products.

Field Crops Extension

Wheat and barley are considered the main produced crops in the Nineveh Plains area and their success usually depends on annual rainfall. In Al Hamdaniya for example, annually about 45-50 thousand hectares of land are planted with both crops. The production varied over the years, depending on the time and amount of rainfall. According to data from previous years, the average yield for wheat was 552 kg./ha in 1992/93 and 1000 kg per hectare in 1996-1997.

With regards to the agricultural development obstacles, the results showed that the item “recurrence of drought years” was ranked first, while “Viability of land for crop production without the other” was ranked last of the obstacles list. Concerning

the agricultural production situation, the item “Fluctuation of rainfall” was ranked first, and the item “recent shortage of cooperative agricultural societies” was ranked last. As for agricultural marketing aspect, the item “shortage of cooling warehouses to preserve agricultural crops” was ranked first and the item “difficulty of coordination between the agricultural and animal production” was occupied the last rank. In the agriculture and agricultural sector management, the item “the wrong person in the right place” came first. Whereas the item “overlapping among functions and activities of relevant institutions in the agricultural sector” occupied the last place among study aspects.

The study by Ahmed *et al.* (2013) aimed to enhance the livelihoods of smallholder farmers in Iraq through the implementation of integrated pest management and organic fertilizer application, which was funded by ICARDA. According to the findings of the project, it is suggested that the adoption of improved technology packages, such as integrated pest management and the use of organic fertilizer, can lead to sustainable increases in the productivity of cereal, food, and legume-based production systems. Furthermore, this approach can also contribute to the protection of the environment. Encouraging farmers to adopt these techniques is therefore recommended. The establishment of a conducive policy framework is a crucial determinant of the attainment of broad-based adoption of these methodologies. It is imperative to implement policies that aim to decrease the utilization of chemical pesticides and fertilizers while transitioning towards organic alternatives, employing an integrated pest management strategy.

On the other hand, Hameed (2019) described the wheat crop farmers’ needs, concerns and suggestions regarding the extension services provided by agricultural extension centers around the area of Zummar, Nineveh Governorate. A systematic random sample was selected from farmers (152 respondents). Data was collected by questionnaire through personal interviews, Pearson simple correlation was used, and percentages coefficient to data analysis. The results indicated that about 70% of farmers in the study area depend entirely on their farm’s husbandry and mainly on wheat and barley crops production. Also, the results demonstrated that only about 50% of farmers owned their land while the rest were either renting, contracting, or sharing land with other landowners. About 60% of farmers mentioned that agriculture extension services have a low-medium impact on their knowledge and about 70% on their skills. About 85% of the wheat farmers expressed their need for extension services with support in agriculture inputs such as certified seeds and fertilizer. The study concluded by suggesting activating the extension services provided for wheat crop farmers and developing extension programs that fit to the nature of the inputs available to farmers or bringing new ideas and technology to the area of the farmers via field demonstrations.

The agricultural extension personnel and labor force operating in Al Hamdaniya and its surrounding regions, namely Bashiqa and TelKaif, encounter several hindrances that impede their ability to offer practical assistance to farmers on a broad scope. These obstacles include insufficient resource coordination from the relevant ministry and agricultural departments, as well as repercussions stemming from the recent conflict in the Nineveh Governorate. In addition, there exist several technical deficiencies in the agricultural sector, including insufficient funding,

inadequate stocks of agricultural inputs, outdated records of agricultural producers, transportation challenges, delayed remuneration, and insufficient equipment. Furthermore, extension workers encounter a substantial bureaucratic procedure that lacks adequate feedback mechanisms to cater to the requirements of farmers. Prior to the 2003 Iraq War and the conflicts in 2014, agricultural support was deemed adequate. However, given the significant capacity gaps present in agricultural households, there is an urgent need to provide support to extension workers and facilitate the return of individuals to their respective communities. The indigenous population encounters significant challenges and financial liabilities as a result of their inadequate output in comparison to the exorbitant expenses associated with manufacturing. According to Ajemian, Seckman, and McCoubrey (2017), the aforementioned information is valid.

According to the Agriculture extension in TelKaif Agriculture Directorate (2019), they arranged training for 27 farmers on conservation agriculture practices or cultivating wheat in a zero-till system by using agricultural machinery and new seeds that work to preserve the soil in addition to increasing the productivity of the crop and reducing time and costs and reducing the fuel and rationalization of irrigation water. After training, only one farmer in Al-Qubba village adopted this technique in a part of his land. Some modern agricultural machinery such as tractors, combine-harvester and threshers, along with new methods of treating and curing plant epidemics now exist. However, irrigation is still a problem in the area, and farming still relies on rainfall. On the other hand, Tarzi, (2019) reported that fires, security issues, destruction of irrigation channels, and droughts are the main obstacles facing the striving of field crop production and mainly wheat and barley in these areas.

FAO (2022), reported that via a project supported by European Union between 2019 and 2022, and due to the significant depletion of farmers' properties, productive assets, and working capital after IS occupation in the Ninawa area, a number of 280 wheat and legume seed growers in Nineveh Governorate have received the support of inputs and training, 500 farmers trained for fodder production and provided with inputs such as seeds. In addition, support and training in the value chain of wheat and legume seeds, vegetables, animal fodder, animal health, dairy, etc. have been provided to more than 23000 households. This support for smallholders with key agriculture inputs, equipment, and training courses to improve agriculture production, processing, and marketing will contribute positively to the striving of the agriculture sector in Iraq.

According to the Agricultural officers in each of Al Hamdaniya, Telkif, and Bashiqa, in the 2022 season and due to the severe drought in the area almost 100% of rainfed grown crops of wheat, barley, and other legumes have been damaged and not harvested and this negatively reflected on the farmers' decision for growing rainfed crops in the next season and, because of low sources of water, only a few farmers have been recorded for irrigation sowing of wheat. Therefore, seeking alternatives in which farmers promote new tactics, technology, and ideas that help them to take the right decisions regarding the selection of their main crops, activities, and action. Modernize part of the agricultural sector that will allow for larger mechanized harvesting and post-harvest handling, storage, and transport, and also invest in (cold) storage facilities, wholesale function, transport and marketing of

produce; Support establishment of producer marketing groups, allowing them to pool funds and access larger markets and market players, including purchasing of (mechanized) equipment, storage, etc.

Horticulture Extension

Al Hamdaniya and Tall Kayf, are considered the locations of "livelihoods" of Iraq, and it is one of the most fertile plains in the country. The Ninewa districts profit from fruits and vegetables such as (tomato, cucumber, melon, watermelon, pepper snake cucumber, etc.) In the summer these crops constitute 70-80 percent of household income. The area is also famous for cultivating olives in addition to vegetables and fruits ("The Labor Force in Nineveh", 2017).

Lange (2022) shows that agriculture was one of the main and ancient trades practiced by Christians in the Duhok Governorate. The Christian peasant, like the rest of the peasants in the province, cultivates his land in proportion to the climate of the region, the quality of its soil, and the amount of water required for irrigation. Among the most important crops that were grown in Christian villages are wheat, barley, rice, and some secondary crops such as vegetables and fruits. The agricultural commodities that garner attention from both the local populace and extension workers include tomatoes, okra, eggplant, cucumber, wheat, barley, chickpeas, kidney beans, lentil beans, onions, watermelons, cotton, sesame, sugar beets, cabbage, cauliflower, and potatoes, (Ajemian, Seckman and McCoubrey, 2017).

Teleskuf and Bbasheqa are considered vegetable production centers, especially watermelon which comes with its attractive shape in which the decorative peel mixes the golden and green colors, and it is tastefully eye-catching due to the suitability of the climate and soil of the agricultural lands surrounding the village for its cultivation. In addition to the care from the farmers to improve its types for decades, and a choice of special types of it for cultivation, based on the experience of the people of the village, in terms of shape, taste, and seeds; watermelons came in several types, including what distinguishes it from the others between its large size and the combination of sweet and light sour Taste.

The people of TelKaif and its affiliated sub-districts and villages used to store vegetables such as watermelon for the winter season by drying it and it is called (Haluchak), as it turns into small pieces, and is dried in the sun and stored afterward. As for the melon seeds (kly), it is one of the best nuts in the village, especially used on cultural occasions of Sundays and holidays. During cold winters in the past, these seeds are considered desirable nuts, as the price per kilo reaches 5000 Iraqi dinars (Eazbu, 2009).

The importance of potato crop production in TelKaif lies in the fact that it is one of the green vegetables in many countries of the world and among them Iraq, because of its nutritional and economic importance, Iraq occupies an important position in international trade. This crop is ranked fourth after wheat, rice, and yellow corn. Among the important areas in Nineveh in the cultivation of this crop is the region of TelKaif in which potato cultivation flourished and there is a wide variety of cultivars. The cultivated area in the TelKaif region constituted 35% of the total cultivated area of this crop in Nineveh Governorate (Younis, 2013).

Armenian cucumber production is one of the vegetables mentioned that also is known as yard-long such as cucumber, snake cucumber, and snake melon. Among the other foodstuffs that were produced in TelKaif and exported to the Mosulian market, includes particularly, melon and Armenian cucumber, snake cucumber, snake melon). Also, TelKaif is famous for cultivating these crops and exporting them to the Mosulian market. Turshi / Pickled Vegetable factories in Mosul were dependent on the TelKaif-market for their high quality and flavor. (Saint, 2016). TelKaif was also famous for even semi-arid watermelon. The surplus productions were placed on the street for sale, sometimes used for seeds during transportation constraints, high yields, and price reduction, depending on supply and demand.

The Ministry of Agriculture announced that it produced large quantities of fruits such as peaches of various types during the agricultural season 2019 within the scope of work of the Alqush Agriculture Division in Nineveh Governorate. "The productivity of the botanical garden project for this season has reached more than 100 tons of peaches so far, and the harvesting process is still ongoing," the ministry said in a statement. The project is one of the extension projects that were created by the Directorate of Agriculture in the province in 2016 with an area of 50 dunums planted with peach trees in many types, including mystic, heel and other grafted varieties and with 5,500 Italian trees.

FAO (2019) reported that the Iraqi province of Nineveh will benefit from the huge European Union contribution of 15 million Euros to the Food and Agriculture Organization (FAO) to restore agricultural livelihoods. The project is part of the FAO response in Iraq. The project is in partnership between FAO and the European Union for farm families. It is expected that approximately 10,000 vulnerable agricultural families (about 60,000 people) will benefit directly, in addition to the benefits that local service providers and workers will gain. The project will support farmers of small fields and those who couldn't repair their land through irrigation systems, grain supply, fertilizers, forages, and supporting vegetable production and animal projects. On the other hand, the project will encourage women to contribute to enhancing family income via participation in agriculture (vegetable and dairy production) and agricultural graduate by involving them in training campaigns and extensions mainly in horticulture and animal health and food security data collection. The project responds to the urgent needs of the families from food and provides job opportunities in the long term.

Al-Kakai, (2015) reported that according to official statistics, 10, 10 million acres, some of which are close to the Tigris River and produced mainly wheat and barley crops, so the province was called (Iraq's bread basket) because it supplies Iraq with these two crops and a percentage in Nineveh alone is 40% of total Iraq's production of this strategic agricultural product, in addition to cultivating crops and other vegetables, such as tomatoes, potatoes, cucumbers, and others in its fields.

However, the district is also well known for vegetables such as tomatoes, potatoes, cucumbers, and others that are produced within its fields that depend on two irrigation systems. The first is always rain and the second one is going through irrigation from rivers and streams and the use of sprinkler technology, especially after working on the island irrigation project west of Mosul (Campana *et al.*, 2022).

In the Nineveh Plains, profits from fruits and vegetables in the summer constitute high household income (Youkhana, 2019). The most important agricultural crops for Yazidis are olives and vegetables (Pieroni and Cattero 2019). The two Yazidi small towns, namely Bashiqa and Bahzani have been agriculturally well known for ages for growing olive trees from which Yazidis made local olive soap. Onions are grown in Bashiqa and Bahzani is considered the best species of onions in Iraq. The Yazidis observe fasting for forty days of solitude in the summer, thinking that during these days the wind has an effective role in ripening the various types of summer fruits and vegetables, not just the sun. This period occurs between the completion of the harvesting of the gains, filtering them, and storing the annual needs while maintaining the next year's share of the seed and sowing it later (Bourhrous and Driscoll 2023).

Livestock extension

According to Jahn *et al.*, (2015), Iraq's animal wealth and its distribution are as follows; 1- Cows: The country's cow population is estimated at (1.5) million head, mostly concentrated in Baghdad, Nineveh, and the plains of Nineveh due to the large number of people there and their need for meat and other foods milk Products. 2- Sheep: The estimated number of sheep is about 9 million head. Nineveh Governorate comes at the forefront of the provinces in its breeding to provide wide areas for grazing in them. 3- Goats: Their numbers were estimated at (0.74) million in 2003, most of which are raised in the northern provinces, especially in Nineveh, because of the animals' climbing ability.

In Nineveh, livestock is at the forefront of livestock among the provinces of Iraq, as it is famous for raising sheep, it has accounted for about 16.2% of the number of sheep along with raising cows 3.1%, goats 7.7%, and buffaloes 4.9%. The village of Al-Kukajli is located in the east of the city of Mosul on the commercial road between Mosul and Erbil. Here the sheep breeding profession is one of the most prominent professions practiced by the people of this Shabak's village, and therefore this village is one of the largest sources of sheep that abound there: specialized khans (Khan Animal Husbandry) for sheep fattening. This process is called (halal linking) and one of the villagers says that there are 2000 families in Kokkjali village that practice the profession of fattening sheep and each of these families has the ability to fatten (30 - 50) sheep within six months.

The Nineveh Plains region (area of all Iraq's minorities including Turkmens) with an agricultural nature, is considered one of the best areas for animal husbandry. The area was, before the IS terrorist period, leading in fattening calves and sheep and raising cows and poultry. Families in these districts raise sheep, cattle and local poultry breeds for their livelihoods. This sector was subjected to extensive destruction during the IS terrorist gangs' control of the governorate. Khadr (2014) stated that the IS, after invading the area around Mosul intended to control and take hundred thousand of animals, mainly cows, cattle, sheep and poultry farms in Nineveh plain which involve different Iraq's nations and religions. The displacement of nearly one million individuals and the destruction of approximately 20,000 commercial and governmental structures, such as educational facilities, animal husbandry projects, and training institutions, have been reported in the region. Upon

returning to their places of residence following the recapture of IS-held areas, farmers discovered a significant amount of their infrastructure had been destroyed, assets had been looted, and their livestock was either missing or had been slaughtered, as reported by Mathieu, 2017. The aftermath of IS defeat has resulted in persistent instability, which has impeded the progress of reconstruction efforts and the resumption of sustainable livelihood activities. In the spring of 2019, a mere 61% of Nineveh Plains' locations reported the resumption of most or all agricultural or livestock activities that were prevalent prior to the emergence of IS. In contrast, 37% of the locations reported the recommencement of some activities. The agricultural output in Al Hamdaniya has not yet attained the production levels that were observed prior to the IS era. According to a report by the International Organization for Migration (IOM) in 2019, agricultural practitioners in Al Hamdaniya have resumed the cultivation of wheat and barley, while the reestablishment of orchard and livestock operations remains elusive. The resumption of production activities has been affected by various factors such as supply chain disruptions, limited access to resources, delays in obtaining the necessary capital that was previously misappropriated, insufficient financial resources, and impairment of water irrigation infrastructure. (FAO, 2020). Casana and Laugier (2017) states that after two years from IS liberation, all families try to move to the restored villages and growth has begun to return animal breeding in this region, especially considering an agricultural season. This is providing the farmers with good pastures, which contributed to the return of most breeders to their fields, despite their poor financial means and the absence of government support. Life is gradually being taken back to the animal husbandry sector in the villages and towns of the Nineveh Plains. The breeding and fattening of the livestock sector have begun to recover and the breeders are returning to their fields.

According to the FAO's (2021) initiative, the project in Nineveh Plains aims to assist 23,000 smallholder-farming households over the next three years in restoring their agricultural livelihoods, enhancing their income diversification, and attaining food security. The project facilitated the rehabilitation of vegetable production for smallholder farmers who were at risk, promoted the implementation of efficient water usage and irrigation management, incentivized the development of agri-food processing, enhanced small-scale dairy processing and marketing, and elevated animal fodder production and conservation. Female individuals are encouraged to engage in the cultivation and processing of vegetables and dairy products within their households. Unemployed graduates in the field of agriculture are advised to undergo training in order to secure employment as facilitators for farmer field schools and farmer business schools, operators of market information systems, community animal health workers, and analysts and collectors of data pertaining to food security and nutrition within the agri-food processing industry.

Poultry raising projects are one of the pillars in Iraq to develop the economic structure. It is a process of production and service that provides the markets with egg and meat which supports thousands of working families. Nineveh Governorate has the largest infrastructure for the poultry industry in Iraq and until the beginning of 2003, it supplied most Iraqi markets with chicken meat products and table eggs. Prior to September 4, 2003, these fields were running at full capacity with the support of

the Ministry of Agriculture, which supplied farms with food, veterinary care, and fuel to ensure the production process IOM, (2021). The production process was hindered by the loss or weakness of some of the services. Due to the high costs of production, this rich economic experience is currently being disregarded. The local market products are unable to compete with the price of imported chicken meat and eggs on the local market due to the loss of governmental support and high production costs. Due to shifting prices, diseases, and continual mortality, the majority of breeders were stopovers to raise meat chickens and laying hens. Breeders still wish to continue their line of work and be supported by an extension program for raising animals, a vaccination program, financial loans, and support, and receive assistance from the Ministry of Agriculture.

Official statistics indicate that in Nineveh, there were 325 broiler chicken farms, which are distributed in the districts of Mosul mainly concentrated in the northern part of the province including TelKaif. The district is considered an extended area suitable for agricultural crops, namely, those included in animal nutrition. Different legumes such as chickpeas, lentils, and yellow corn as well as wheat and barley are produced in areas that are of great importance for animal husbandry (Layard, 2023). Al Hamdaniya is also one of the biggest districts working in this sector in Nineveh province. There are 150 poultry projects including egg and meat production in Bakhdida (Nickname of Qaraqosh- represent the center of Al Hamdaniya district) (Kaki, 2008). In Bashiqa, the situation became better, in 2012 a modern private hatchery has been established. The production capacity of this hatchery is 8 million per year. The hatchery consists of six sets and twelve incubators, each incubator contains twelve containers, and each container contains 4,800 eggs. Most of the chicken farmers in Nineveh Plainss believe that such projects are the best for job creation and economic development in Nineveh (Morrison 2017).

In 2014, the Nineveh Plains territory was overtaken by the Islamic State of Iraq. It is notable that most of the poultry farms that belong to minorities were destroyed and looted by the Islamic State (IS). The majority of those minorities were from vulnerable ethnic and religious minority groups including Yezidi, Christians, and the Shabak people. In Shabakia villages, livestock (mainly cows and cattle) were raised for meat production were slaughtered. The poultry fields where many of the Shabaks occupy were destroyed and looted (Khadr, 2014). Furthermore, as a consequence of ISIL's advancement, communities were constrained to evacuate, and they could only manage to bring a limited amount of their livestock, resulting in the loss of numerous animals during migration. Upon the return of communities, it was observed that their livestock had either been looted, slaughtered, or gone missing as a result of actions carried out by IS. (RFSAN 2016). The average amount of poultry, cattle, sheep, goat and buffalo farms lost in all areas was 75 per cent, with figures as high as 95 per cent in some areas (FAO, 2017).

Wilson, L. (2019), edited that Iraq's Christian chicken farmers rebuild their livelihoods in the Nineveh Plains, a region historically home to Jesus' followers dating back to his time on Earth. Prior to the incursion of IS, Qaraqosh, a city situated approximately 20 miles southeast of Mosul in northern Iraq, harbored the most extensive Christian population in Iraq and boasted around 100 poultry farms. The city's populace was either killed or forced to flee by IS, and their agricultural lands

were ravaged. Presently, with the amelioration of circumstances, poultry breeders are revisiting the region. The Stand with Iraqi Christians organization, in collaboration with the International Christian Concern, has devised a plan to facilitate the establishment of two additional farms in July, followed by four more farms by October of 2023, with the aim of aiding farmers. According to Stand with Iraqi Christians (year), it has been reported that every farm is responsible for the creation or sustenance of 134 jobs, encompassing a range of professions such as farm laborers, chicken sellers, hatchery workers, butchers, grocers, feed sellers, veterinarians, and truck drivers. This generates an income of \$48,000 during each growing period.

Helen (2022) reported that St. George's Anglican Church in Baghdad, along with US organizations Stand with Iraqi Christians (SWIC) in the Diocese of Pennsylvania and the International Christian Concern (ICC), a Washington-based NGO have begun to Support the Re-Establishment of Chicken Farming in Northern Iraq (Nineveh Plains). A manager employed by both St. George's Church and ICC has been vetting and recruiting farmers for the project over the last six months.

In April 2019, a pilot initiative involving two farms got underway, and since then more than 6,000 chicks have been sold. In the summer, two more farms will open and if enough money can be obtained, six more will do the same in the fall. An average of \$13,000 is needed for each farm's start-up expenses, which include the purchase of 3,000 chicks, feed, water, electricity, and veterinary care, including vaccines. The remaining \$4,000 is contributed as "skin in the game" by the farmer, who must also have the acreage and chicken coops to sufficiently house the first 3,000 chicks. SWIC, in collaboration with Epiphany and others, has pledged to generate \$6,000 for each farm. ICC has committed \$3,000 per farm. It is intended that each farm will be self-sustaining once the first batch of chicks is sold (typically in approximately 50 days), using a portion of the sales to buy the following batch of chicks, feed, etc. All upcoming monies raised will be used to launch new farms. However, should unforeseen difficulties develop, the participants are prepared to support the project farms.

CONCLUSIONS

Agriculture is a vital sector in Iraq which has an important role in creating job opportunities and enhance income for the rural community and impact positively on economic and society stability. It is also a labor intensive and able to absorb large amounts of labor, upstream and downstream. Wheat and barley, vegetables such as tomato, cucumber, onion, watermelon, and pepper snake cucumber, etc. in addition to raising sheep, cow and poultry production are considered the main agricultural practices in the Nineveh Plains area. Climate change impacts and mainly severe drought in the area affected rainfed crops such wheat, barley, and other legumes and this negatively reflected on the farmers' decision for growing rainfed crops in the next season. And, because of low sources of water, only a small number of farmers could adopt irrigation for wheat sowing.

During the 2014 conflicts and IS invasion to the area, most of the agricultural products, machines, and other materials have been destroyed or breakdown, and most animal projects such as poultry and sheep farms that belong to minorities from vulnerable ethnic and religious including Yezidi, Christians, Kakai and the Shabak

people were destroyed and looted. The livestock (mainly cows and cattle) that were raised for meat production were stolen or slaughtered in Shabak villages. After the liberation of the Nineveh Governorate, the affected farmers were not compensated properly.

Besides the destruction of the infrastructure of agricultural production and low level of agricultural extension services, absence of new technology and practicing traditional methods in agricultural production states the main reasons behind low productivity. Therefore, seeking alternatives in which promote farmers to adopt new tactics, technology, and ideas that help them to take the right decisions regarding the selection of their main crops, activities, and action is of great importance and priority should be given in this direction. The Nineveh Plains can work toward revitalizing its agriculture sector, improving food security, and boosting economic development in the region. Additionally, it is essential to engage local communities and stakeholders in the planning and implementation of these initiatives to ensure their sustainability and success.

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CONFLICT OF INTEREST

The authors state that there are no conflicts of interest with the publication of this work.

واقع أنشطة الإرشاد الزراعي في منطقة سهل نينوى بعد التحرير 2017-2023

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الخلاصة

الهدف من هذا البحث هو دراسة تحديات القطاع الزراعي بما في ذلك المحاصيل الحقلية والبستانية والإنتاج الحيواني والإرشاد الزراعي في منطقة سهل نينوى بعد تحرير داعش حيث يعتبر سهل نينوى "سلة خبز" العراق، وهو واحد من أكثر السهول خصوبة في البلاد. في عام 2014، اجتاحت داعش أراضي سهل نينوى. وتشير التقديرات إلى أن ما يقرب من مليون شخص قد فروا من منازلهم، ودمر ما لا يقل عن 20,000 مبنى

تجاري وحكومي، بما في ذلك المدارس والمشاريع الحيوانية ومؤسسات التدريب. لتحقيق التنمية الزراعية المستدامة، من الضروري الاستخدام الأمثل للموارد الطبيعية والبشرية والتقنية ورأس المال من خلال الثقافات حيث يتم استكشاف استراتيجيات لتحسين كفاءة وفعالية وإدارة التنمية الزراعية. الهدف العام لهذه الدراسة هو تقييم سبل العيش من خلال الزراعة في المجتمعات الريفية، وتسليط الضوء على احتياجات المزارعين لاستعادة الزراعة، وتقديم المقترحات والحلول ذات الصلة بالثقافات المختلفة في هذه المنطقة. اختار هذا المشروع بشكل استراتيجي أفضية الحمدانية وتكليف وبعثيقة لإجراء المقابلات والزيارات وتقييم الاحتياجات. التغيير والتنمية في القطاع الزراعي يمكن أن تجعله محركاً للتنمية الاقتصادية ويمكن تحقيق التوسع الزراعي وتحسين الإنتاجية في مرحلة ما بعد الصراعات من خلال التركيز على التنمية الزراعية الذي يشمل تحسين مهارات الفلاحين، وبيئة الاستثمار، والري، وتوفير البيانات والمعلومات، والتقليل إلى أدنى حد من تقلبات الأسعار.

الكلمات المفتاحية: سهل نينوى، أقليات، الإرشاد الزراعي، التحديات الزراعية.

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