

Inventive practices during the spread of the COVID-19 pandemic in rural society in the region of Ghardaïa (Algerian Sahara).

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Abstract: - The Algerian government imposed a complete closure of various vital activities to prevent the spread of the Covid-19 pandemic, starting from March 2002, resulting in the closure of local markets and mobility restrictions, and the movement of the population between different areas.

This research paper aims to analysis the impacts of the pandemic on agricultural practices in two oasis rural in the Ghardaïa province faced these new challenges. To do so, we rely on the interviews conducted with rural actors in the oasis of Mansoura and Hassi Lefhal in the northern Algerian Sahara. In order to highlight the various practices that individuals have used to reduce the fragility of livelihoods.

Key-Words: Covid-19, agricultural, farmers, oasis, resilience, Ghardaïa.

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1 Introduction

As The spread of the new epidemic, Corona, in the first six months of last year, caused a change in the course of most societies politically, socially, and economically, and the shortcomings that were eroding the health system of the entire world emerged, and despite the resilience of some countries in the face of the rapid spread of the epidemic (Qushou, 2020), they suffer today from a severe shortage of The financial capabilities to complete its war on the economic and social sector. The impact of the epidemic on all sectors of the economy and all sectors of society appears to be evident, owing to the ban on the action, the lack of employment opportunities, and the closure of most important centers. Although these measures have helped to control the disease, it was coupled with negative socio-economic impacts, for example, a high unemployment rate, a decline of investment and increase social disparities (Addoun.2021).

In March 2020, when lockdown measures were announced in many countries across the world,

people were urged, if not obliged, to stay home and keep their distance from each other in an attempt to slow the spread of COVID-19, which caused huge damage to the health, economy, and social life of the communities (Aribi and Sghaier,2020).

On the other, many businesses, old souk markets, and local shops to temporarily close and national and international transportation was almost completely halted. We too, the author of this research , all of a sudden had to put our field work, taking into account the developments of the this epidemic in the oasis areas of Algerian Sahara.

We chose two oases (*Mansoura* and *Hassi Lefhal*) in the northern Algerian Sahara, as a case study because of its agricultural marked commercial attraction in rural space and terms of social actors. These oases is also well known for its high level of smallholder farmer prestige but suffered from vulnerability and resilience. This caused difficulties for residents in meeting their sundry daily needs.

The manuscript has been organized in light of these elements and our previous work with various rural actors in two oasis regions of Mansoura and Hassi Lefhal. The study addresses several questions, including:

- How do you treat the local residents deal the restrictions associated with to the novel Corona Virus Disease 19 ?
- How did small farmers market their products when the souks were closed? what practices have compensated their activities during the pandemic?

2. Study Area

The study took place in two Saharan oases (*Mansoura* and *Hassi Lefhal*) in *Ghardaïa* province, which is located in the north-central Algerian Sahara (Figure 1). This region is the capital of the *Mzab* Valley, and thus it occupies an important strategic position representing the gateway to the Sahara with its northern center (Addoun et al., 2019). It is a vast Saharan area with an area of 86.000 km², occupying nearly 3.61% of national territory but containing less than 1.19 % of the national population (RGPH, 2020). It is generally renowned for farming activities.

In these oases a significant part of the local population still lives below the threshold of livelihood from a social point of view and socio-economic profiles, it has impacts on the living populations in these desert environments, which modify their traditions, their know-how, their food security and adaptation to conditions facing climate change

In both Oases, agriculture and animal husbandry are essential for the inhabitants. Agriculture is characterized by a diversified production system combining date palm, fruit trees, cereal, legumes, and vegetables. In addition, the livestock sector is an important component in the farms of the study area. Sheep farming is the most important followed by goat, cattle, and camels.

In recent decades, the implementation of agricultural development programs aimed at improving the country's food security and the living conditions of the population (Idda S et al., 2017). Indeed, Saharan agriculture based on self-subsistence, must ensure income, meet the food needs of a growing and urbanized population, and contribute to the country's food security (Kousmine, 2005; Djennane, 1990), which contributes to the emergence of new forms of agriculture in the arid and hyper-arid regions of southern Algeria.

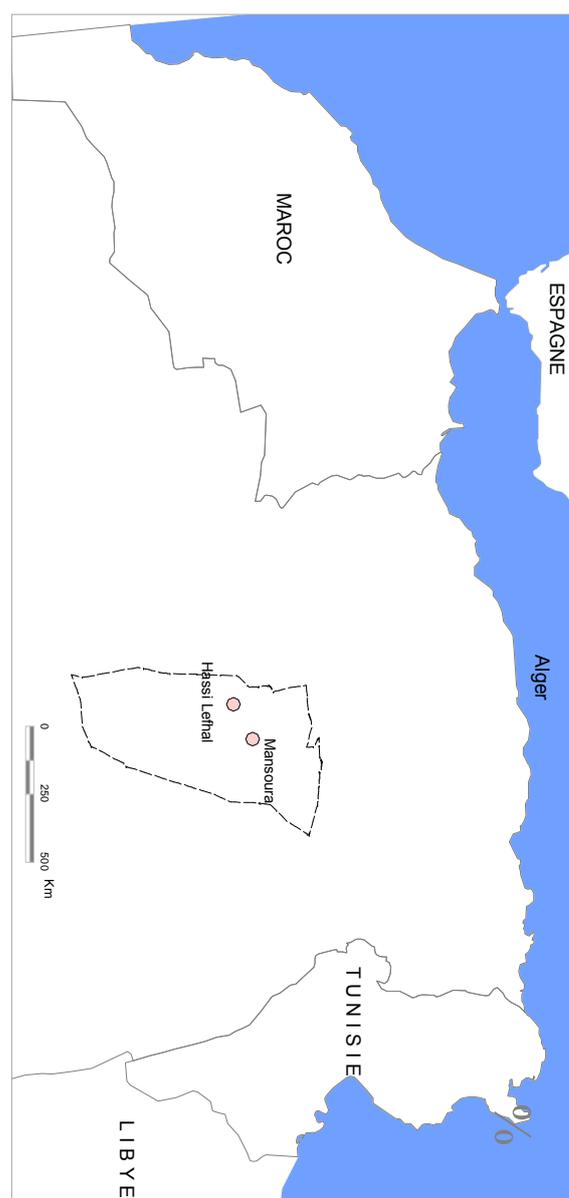


Fig.1. Study area.

On the other hand, access to land and groundwater coupled with encouragement from the public authorities through the granting of subsidies,

have contributed to the emergence of agricultural extensions on the edge of the old oases (Ftouhi et al., 2021). This has also led to a sedentarization of pastoralists who practice animal husbandry less than before. Dairy production exists mainly for domestic consumption. In addition to food crops, local farmers and national investors have introduced high-value crops for national and international markets, such as Deglet Nour and Ghars dates in the Mansoura oasis and annual crops in the Oasis of Hassi Lefhal.

3. Material and Methods

This study is based on our pre-COVID and pandemic work with oasis communities for research on agrarian and rural dynamics in the desert environment.

When the confinement was introduced, we made sure to work in hybrid in contact with different rural actors. However, we had to employ direct fieldwork and remote fieldwork, given the confinement and mobility restrictions.

Thus, between March and December 2020, semi-structured interviews (in the oasis of Mansoura and the oasis of Hassi Lefhal) were conducted with small farmers, young producers of Hassi Lefhal watermelons and, dates. Mansoura workers certain households from traditional oases and their extensions.

We collected data and phone interviews were supplemented by exchanges social media. Conducting fieldwork from a distance is challenging and very different from the face-to-face customary investigations experience we are used to. Though research has been conducted remotely by phone or through digital platforms for many years mostly focusing on western societies (Leonardelli et al., 2021), in our research, we may imagine where different respondents are while talking to us on the social media and who is around them, but we do not know. This stage forces us to conduct our data analysis and interviews through a coding process.

The objectives were to understand: How were these rural actors experienced the pandemic and how it impact them? How did they adapt their farming practices? to help reduce the vulnerability of households.

4. Results and Discussion

4.1. Disruption of Activities in Oasis Society

In the two Oases, the pandemic and, the containment have had many impacts on the experience of the most vulnerable categories (young people, women and small farmers), thus affecting their means of subsistence, and how to adapt to the consequent situation of the pandemic. Although predominantly rural, most of its inhabitants live in rural areas and agriculture; 31 rural settlements in Hassi Lefhal and 17 rural settlements in Mansoura (RGPH, 2008). The population of Mansoura, according to (ONS 2020), is estimated at 4.723, and the population of Hassi Lefhal is 5.921 inhabitants, with a population difference of more than 1.100 inhabitants from Mansoura.

4.1.1. Rural Souk Dynamics: Disruption of Local Commerce

In the Sahara, the souks or weekly markets are of great geographical, economic, and social importance, also these markets, play the role of polarizing different territories and allowing economic prosperity in rural and urban areas. They are also a space for meeting and exchanging information and profits (Addoun, 2021).

Souk Hassi Lefhal is one of the most important souk in the southern region; it is fixed every Saturday, intended for the sale of agricultural products of great consumption such as melon, watermelon, vegetables. Due to this souk, Hassi Lefhal becomes a place of exchange of agricultural products, especially the northern regions, and whose area of influence is regional, even national.

In Hassi Lefhal, there are dozens of agricultural farms that were the result of attracting the investors local and outside the region, and this was in recent years when the new agricultural investors have entered the Oasis and an increasing number of local farmers, mostly young local farmers, started cultivating commercial crops, and particularly watermelons and melon, both aimed for the national and international markets. Changes in the agricultural landscape of the Hassi Lefhal have created new opportunities for young farmers.

However the small farmers faced great challenges during the spread of the pandemic, so they were keen to increase production to cover the increasing demand for agricultural products. This created a new dynamism in the region.



Fig. 2. Landscape the souk Hassi Lefhal unexpected change during a pandemic

During covid-19; mobility restrictions and the difficulty of obtaining travel authorization give it difficult to access the Hassi Lefhal region. As watermelon cannot be stocked, smallholder farmers were reluctantly forced to accept prices offered by buyers. In addition, in normal times, they chose the best watermelons for export and the farmers sold the remaining watermelons in the local markets of the Ghardaïa province. However, the closure of markets prompted them to leave these watermelons to rot in place or give them to livestock.

Importantly, these regions attract each year a large mass of men and women, who rely on agricultural wage work to support their and their household's livelihood throughout the year. Also, some migrants coming from sub-Saharan Africa, who work in farm agricultural enterprises, work for a daily or monthly salary. The latter are usually undocumented and work temporarily in Algeria, as they try to save money to reach Europe (Leonardelli et al., 2021). The majority of migrants from African states prefer to cross into the Algerian regions in order to continue on with migration to Europe (Lensari et al., 2019).

4.1.2. Mansoura: Disruption of Date Product Merchandizing

The Date palm is a strategic fruit crop in North Africa and the Middle East because many socio-economic activities depending on it (Bedjaou et al., 2018). However, the date palm constitutes the major production of the Saharan regions. It largely contributes to the formation of agricultural income in these regions, which represent nearly 10% of the national population (O.N.S., 2008).

On the agricultural level, the oasis of Mansoura is experiencing significant development in terms of puericulture (date palm-culture), cereal farming under pivotal and forage crops. Moreover, it is relatively rich in varietal diversity of date palm, because of its central position of the northern Sahara, compared to the dates of other regions of Algeria, where there are many nomads settled in this oasis, the great mobility of its inhabitants, and also a more great use of local varieties.

Thus, palm cultivation is a prerequisite for other agricultural activities in the oasis, such as market-gardening and livestock. In the past, a large number of agglomerations in the Sahara have been able to exist and develop due to the exploitation of palm trees. Many small and medium-sized oases in the South owe their survival to the existence of palm groves.



Fig.3. Date product abundance in the Mansoura Oasis during the pandemic

During the second wave of COVID-19 infections, in October 2020 coincides with the harvest period of dates in the Mansoura oasis. where the production rate exceed 20.000 tons in 2020 compared to the pre-Covid period, with a production rate of 18.418 tons of the Deglet-Nour variety in 2018 (DPSB, 2018), This production was ensured by 38.440 productive palms, out of a total of 42.535 palms, on an area of 38.440 hectares. The average yield (0.48 kg / productive palm).

Where, small farmers faced difficulties particularly in selling dates of the Deglet Nour variety, which is mainly produced in the ancient oases and the new extensions for commercial purposes. To get away from the monopoly of intermediaries who have a strong grip on the marketing price and they use it as a weapon when needed, also small-scale farmers usually store this variety of dates in cooling stations to shop later, or while waiting to find suitable markets.

The production of the date palm variety was previously; more than 10% of the production is exported, mainly to Europe (Bessaoud et al., 2019). However, following the closure of markets and borders, the suspension of public and private transport, and bans on family gatherings, much of the previous fall's date production was not sold. Thus, in the fall of 2020, the cooling stations in the region were saturated, while the dates of the new season had to be harvested, with the concern of finding quick solutions for the marketing of dates.

5. Labor Shortages and Rarity of Work Opportunities

In the two oases, the harvest of dates and watermelons relies on a regional labor force that joins the local workers; about half of the workers come from sub-Saharan regions and work illegally in the agricultural fields; especially in the new agricultural land the Hassi Lefhal. The crisis linked to the pandemic has accentuated the daily difficulties and social and material injustices that many female agricultural workers already face (Bossenbroek et al., 2021).

In the locality of Hassi Lefhal, movement places where workers meet in search of daily employment, have been banned, making their recruitment difficult, and the employment crisis is worsening day by day, where the agricultural products is available and the employment is not available.

For example, the price of loading a truckload of watermelons in Hassi Lefhal is usually 10.000.00 to 15.000.00 Algerian Dinar. It was the same in the locality of Mansoura where the low availability of skilled labor at the local level and the inability of workers from nomads coming from Tamanrasset region, located 1260 km from Mansoura, to move around, led to an increase in wages, which went from 200 to 600 DA / palm tree.

During the lockdown, the organization of agricultural labor has been strongly impacted, in two localities. This has first of all passively affected small-scale farming families who depend on agricultural laborers and even more agricultural laborers themselves. Those families cultivate their own land without resorting to foreign labor and usually hire laborers temporarily, most often without employment contracts (Bossenbroek and Ftouhi, 2021). To perform some farming tasks such as watermelon collection, sorting dates, gathering and, harvesting, preferred to manage all the work among family members as in the locality of Mansoura. In this way, they attempted to reduce contact with other people and, thus the risk of existence infected as well as to limit the expenses for agricultural inputs-given the difficulties in commercializing the produce.

6. Promoting Alternative Activities in Times of Covid-19

In the oases, family members often engage in non-agricultural activities to diversify their income, including trade, tourism, crafts and, construction work. This proactivity is essential to face new challenges, such as the difficulty of marketing dates, and melons, watermelons. However, the pandemic has severely tested this proactivity and therefore the capacity of oasis families to respond to new challenges, making them more vulnerable, whose

incomes are highly dependent on agricultural activities and the exploitation of rare and fragile natural resources (Fetoui, 2011). The agricultural activity becomes incapable of providing agricultural products in quantity and quality for marketing and even for family self-consumption (Fetoui et al., 2021).

In both localities, the public authorities have put in place initiatives to support vulnerable populations. However, in October, the state was granted an amount of 10.000 DA to families affected by the pandemic and containment. However, some affected families were unable to benefit. An amount of one million dinars for a small family is not enough to cover the basic needs for one month, given light prices, high cost of living, and deteriorating livelihoods.



Fig. 4. tea tent, it is one of the solutions to earn a livelihood during the pandemic

At the beginning of the gradual lifting of the Covid-19 pandemic, unemployed young people went to alternative activities to cope with the pandemic. Where we see the spread of shops and tables selling Saharaoui tea in the towns of Mansoura and Hassi Lefhal. In addition, this phenomenon is dispersed in most Sahara regions, young people are used it to minimize their livelihoods.

7. Reinventing Farming Practices in Times of Pandemic

In this part of the work, our interviews illustrate not only how the pandemic affected the livelihoods of rural actors by making them even more vulnerable but how they coped with the situation after lockdown. we turned the spotlight on the different forms of our experimental work, focusing particularly on how resilience often emerges through different practices of care, that compensated the rural families in the two localities.

We carried out Hybrid interviews since March 2020; semi-structured interviews with small farmers, young producers from the agricultural oasis of Mansoura and Hassi Lefhal, northern of the Algerian Sahara. We start by retracing the emergence of the family workforce; it includes family members who work largely on their field agricultural property. In addition to the emergence of labor in the activity of mini-pasturage, all these activities have been simultaneous since the beginning of the pandemic.

The hybrid interviews can be called the hybrid approach, and it is also used as an intersectional approach to tease out the different responses and possibilities of actors in dealing with the situation precarious of the pandemic. Specifically, we recount how some agricultural investor's laborers ignored the lockdown restrictions as they had to work secretly. Knowing that gatherings are prohibited, lock of travel and movement authorization, and wearing a mask are compulsory.

During the-Covid agricultural landowners were forced to use virtual labor markets to find the men working and work opportunities in reaping the watermelon crop, and marketing agricultural products through social media.

7.1. Virtual Labor Market Development

It is known that the locality of Hassi Lefhal is active among a large number of sub-Saharan Africans who work in its agricultural areas and its surroundings. Most of the national newspapers were published on

June 3, 2020, when a minor was assaulted by African immigrants in Hassi Lefhal, who led seriously injured, which led to his death. At that time, the forces of the national gendarmerie intervened, which took control of the situation and collected and expelled illegal immigrants from Africa. As a result of these events, the Hassi Lefhal region lost more than 80% of the labor force in agricultural activity, most of which belonged to the category of African immigrants

To cope with this situation and lack of labor, young watermelon producers in the locality of Hassi Lefhal have mobilized by Facebook and WhatsApp groups to announce recruiting local workers, as announced by farm owner Ben Hammouda and Ben Houtia on the social network, they asked to be shared in several groups. When someone needs workers, they contact you ... ". When workers did not have access to social networks, they used information provided by friends with smartphones, or by word of mouth (Ftouhi et al., 2021).

7.2. Agro-pastoral Practices to Reduce Costs

The interest in the economic activity of rural youth in different contexts in the Hassi Lefhal region shows different changes in agricultural practices. To minimize losses in the watermelons, young watermelon producers have adapted their practices based on their farming experiences of many years. However, with the Covid pandemic, many farmers have incurred debts as a result of the watermelon supply exceeding demand. As a result, some farmers in the vicinity of Sahbah El-Faj and investors in Oued Tahrir have reduced their costs by reducing agricultural inputs or the area planted with melons, or by reusing water for modern irrigation, or is past to diversify their cultures. Thus, even if most of them made little profit in the second hexagon of 2020, they did not contract any additional debt. They had to resort to family labor, however, the development of irrigation, following intensive use of groundwater resources, led to the introduction of new crops with high added value, particularly market gardening and arboriculture.



Fig. 5. rural practices to reduce costs: (A); herds of goats in the center of the locality of Mansoura; (B) truck of organic manure in Hassi Lefhal.

In the locality of Mansoura, the small farmers in this locality have turned to traditional agro-pastoral practice drawn from the old activity which is part of a rural economic context of this oasis. Where rural families who own herds of cattle, and goats to take advantage of the lint, milk and skins of these animals and put them to good use during the pandemic to reduce their livelihood vulnerability.

In the locality of Hassi Lefhal, the small farmers in this locality suffered greatly from the pandemic, in order to cope with this situation due to the losses suffered the watermelon product; they turned to using manure and manure juice as organic fertilizers and using local seeds. Moreover, the strong local demand for manure has led to the emergence of young farmers selling their manure, thus generating additional income. for those who need the organic manure to access the WhatsApp group or the social network group of Hassi Lefhal for request the required quantity , as you will receive it in record time, as the capacity of a truck varies of organic manure among 5 to 6 million DA.

8. Collective Initiatives and Solidarity Action

Rural communities have shown a kind of resilience practice during confirmed through individual efforts, and also through collective efforts. For example, in the oasis of Mansoura and Hassi Lefhal, the inhabitants of these oases returned after the closure of the towns to their villages of origin when economic activities stopped, their education, tourist resorts and movement bans. The increase in population has led them to engage in small-scale agricultural projects by reconnecting with their ancestral land and with traditional agricultural practices. They took the opportunity to enhance their agricultural activities and restore the palm groves (see Fig. 06).



Fig.6. Restoration the palms of the oasis.

However, the inhabitants of these localities began to pass on to their children a culture of interest in traditional agricultural properties, which they inherited from their ancestors. Also, the students also returned to their home villages due to the temporary closure of universities and offered to help them with agricultural activities in the oasis and the development of small talents and crafts.

The health crisis gave us the opportunity to take care of the oasis, the irrigation system, and to rationalize the use of irrigation water. Local initiatives, or what is called the Touiza, a traditional system of mutual aid that characterizes most community initiatives in the region, have been

organized the practice of Touiza, has also made it possible in some palm groves where farmers, for lack of manpower, mobilized local workers to take turns mobilizing their land, and using them to harvest dates and watermelons, thus reducing their costs.

9. Conclusion

In this paper, we have shown how different rural actors from two localities in the Ghardaïa province (North central Algerian Sahara) faced the challenges linked to the Covid-19 pandemic. This crisis has exacerbated daily difficulties as well as the social, and material of rural families, and the young local agricultural. Our analysis was carried out with the most vulnerable categories: small farmers, labor and young oasis people. as an entry point to show the socio-economic precariousness of many farmers and how it was worsened by the pandemic. Also, this vulnerability is partly explained by the fragile nature of the oasis territories (Leonardelli et al., 2021; Bossenbroek and Ftouhi., 2021), in terms of natural resources and the lack of socio-economic opportunities, which the health crisis has accentuated by the pandemic. In reality, while writing this paper, we do not yet know how COVID-19 pandemic will shape the future, we do not know when we will be able to return to our normal life, and field sites of study, so from the beginning we took the hybrid approach by using social media; WhatsApp and Viber for the purpose of staying a contact with farmers and farm laborers again even from far away.

In phone interviews during the lockdown, the local agricultural workers explained that job opportunities were available in the fields and farms before Corona-virus; we used to work every day, and increase the opportunities of working during the season of dates and harvest of watermelons.

Indeed, because of restrictions on movement, agricultural workers have had difficulty reaching farms and agribusinesses where work is available. The workers were usually transported to farms in open trucks and pick-ups via unpaved rural roads. But, since the lockdown was enforced, the local

authorities have tooked the responsibility of deliver farmers to their distant lands daily and at a specific time. However, as part of solidarity, the state was keen to ease the burden of the pandemic by providing solidarity grants ranging from 1000.00 DA to rural families on the basis of enabling them to manage their own affairs, in order to settle unpaid water and electricity bills.

Through this paper we have highlights the precarious socio-economic situation in rural society of Ghardaïa region, with a particular focus on the case of rural activities and agricultural in two localities agricultural areas of the Ghardaïa province: the Mansoura and the Hassi Lefhal. This precariousness was worsened by the pandemic and the ensuing restrictive measures but continues to be completely disregarded from nation agricultural policies.

However, the state strives to address the fragility of rural families through a rational policy. Also, there is glimmer of hope for addressing the precariousness of vulnerability workers the result of Covid-19. Moreover, following the pandemic crisis, the state instituted generalized social coverage targeting farmers as a priority, by licensing of mobility and the freedom to sell market products.

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