

Covid-19 crisis: What lessons on the role of the informal economy in the Tunisian date value chain?

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Abstract

The objective of the paper is to analyze the stakes associated with the informality in the Tunisian Dates supply chain. We focus on the interdependencies between the formal and informal sectors, interdependencies which have been particularly revealed during the Covid-19 crisis. This crisis has highlighted the fundamental role of the informal sector in structuring the supply chain, mainly in the marketing intermediation links. Based on its impacts on the Tunisian date sector, we revisit the debates on the informal sector and offer a critical analysis of the strategies generally proposed to fight against this phenomenon. Radical strategies to eliminate the informality would have the effect of paralyzing a certain number of transactions in the supply chain inducing vulnerabilities of formal stakeholders. Conversely, a tolerant policy towards the informal economy could in the long term compromise the sustainability of the supply chain. The lessons learned from the Covid-19 crisis suggest, firstly, the implementation of policies aimed to reduce the dependence of formal actors on the informal sector. Such a policy is likely to facilitate, in a second phase, the success of progressive integration strategies of the informal economy into the formal system.

Keywords: Covid-19 crisis, Informal economy, Date value chain, Resilience, Tunisia.

1. Introduction¹

In Tunisia, the informal economy accounted for 35.2% of GDP in 2022 (UNDP-ILO, 2022) and has a greater impact on the agricultural sector (Hassen *et al.*, 2021). Informal employment is estimated at 26.8% of the working population, with a higher rate of informality for self-em-

ployed workers (57.6%) than for employees (16.1%). It is generally acknowledged that the informal economy makes it possible to absorb social insecurity on the one hand, by supporting part of the population and, on the other, by providing another part with additional income (UNDP-ILO, 2022). Based on these observations, a large number of studies (Coşkun, 2022; Leyva

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and Urrutia, 2023) have focused on the role of the informal economy in the labour market, on the impact of this informal workforce on the performance of sectors and on innovation and knowledge transfer (Ibidunni *et al.*, 2020).

Paradoxically, few studies have explored the issues linked to the presence of the informal economy as an operator in the various activities of supply chains (Colovic *et al.*, 2022; Narula, 2019). However, its contribution to the creation of value in agricultural sectors in developing countries, in particular in the Maghreb, and its predominant weight in the sharing of this value is indisputable. The Tunisian date sector can be considered a textbook case in this area.

From this point of view, and to a certain extent, the Covid-19 crisis has acted as a life-size experiment to assess the weight of the informal economy in Maghreb supply chains, and its role in the vulnerability or in resilience of supply chains. As Folke (2006) and Baggio *et al.* (2015) pointed out well before this recent crisis, resilience obviously involves strengthening the ability of stakeholders and systems to respond to economic, environmental and social shocks by anticipating them, absorbing them and reducing fragility. In the face of a possible resurgence of crises in the future, there is therefore an urgent need to draw lessons from this pandemic.

The pandemic has highlighted some of the structural weaknesses of agricultural supply chains in the Global South² and its role in the malfunctioning of the supply chains during the crisis (Zimmerer and Haan, 2020, Rukasha *et al.*, 2021). As we shall highlight in the following sections, informal actors have been more affected than the formal economy by the regulations governing the mobility of stakeholders.³ From this statement, the main objective of the

document is to analyze, through a value chain approach, the points of vulnerability of the value chain of Tunisian Dates in a crisis context, focusing mainly on the role of the informal sector and the interdependencies which link to the formal sector. Considering the feedback from operators, experts, and institutional stakeholders involved in the date sector during the Covid-19 crisis,⁴ it appears that the informal economy is involved in a process of integration into the overall value chain, through close interaction with the formal economy. Thus, we can legitimately ask the following questions: should the informal economy be considered as a factor of vulnerability that must be eradicated, or as an essential player in the structuring of supply chains, which must be accommodated? Will increasing the skills of stakeholders involved in the formal economy be enough, without considering their dependence on the informal economy, as the health crisis has shown (and we shall highlight later on)?

Another question concerns the difficulties associated with public intervention in this context, due to the fact that a large number of transactions are carried out through relationships between the formal and informal economies. The chances of success of such policies in sectors that include a mix of formal and informal stakeholders is at the heart of recurring debates. Phillips (2011) describes the complexity of the relationship between formal and informal systems, and shows how the implementation of an effective policy for upgrading value chains may have asymmetrical effects on stakeholders, generally to the detriment of the informal economy. Should we support a formal economy knowing that it faces both unfair horizontal competition and vertical dependence on informal stakeholders? In other words, what are the social costs and benefits as-

² Regarding the impacts of the Covid-19 pandemic on African food systems see ADB (2021).

³ Government decree no. 2020-156 of March 22nd 2020, which set out the requirements needed to ensure the continued operation of essential services, as part of the implementation of total containment measures.

⁴ Our analysis is largely based on work carried out as part of the European project ValueTEAM, funded by ARIM-NET 2 (ERA-NET), and aimed at enhancing the local and international value of the Maghreb date sector. We have drawn on the various contributions and discussions between experts, institutions and professionals from the Maghreb date industry who came together at a forum (FOPRODATTE) which the authors organised on March 18th 2022 in Hammamet, Tunisia (see Appendix 1). The exchanges between the 51 participants were recorded and a summary was shared with all the participants present at the forum.

sociated with the presence of the informal sector in the date value chain that make financial support for the sector economically justifiable? Can the Government with little capacity for structuring and controlling sectors come to tolerate activities that take place outside the formal economy? This is perhaps one of the reasons why the informal economy has grown considerably in a large number of developing countries, in a context where no public policy has been able or willing to properly eradicate it. From this point of view, an ITES report (2023) considers that approaches aimed at including the informal economy are more legitimate and effective than those that seek to eradicate it.

This article follows on from these debates. While drawing on the lessons of the Covid-19 crisis through the risks linked to the presence of the informal economy in the Tunisian date value chain, we highlight certain structuring effects of the presence of the informal sector which hinder public policies. Do informal activities weaken the sector and reduce its resilience in the face of crises? Or on the contrary, do they provide structure, by enabling certain parts of the supply chain to operate with relative efficiency and organisational rationality? In order to response to these questions, we propose a descriptive and factual analysis of the evolution of the characteristics of the sector before and after the Covid-19 crisis and shed light on economic policy. We fill a gap in the literature by adopting a value chain approach which considers the strong interdependencies that exist between the formal sector and the informal sector: vertical supplier/customer interactions and horizontal interactions between collectors-packers belonging to the same link in the chain. The aim is to put forward ideas and recommendations for the rational and effective management of this phenomenon.

The remainder of the article is organized as follows: Firstly, we will present a diagnosis of the state of the sector before and following the health crisis, as well as the vulnerabilities identified. Secondly, we will highlight the interactions between the formal and informal economies. Finally, we will suggest ways forward and strategies for strengthening the resilience of the sector and mitigating the impact of future crises.

2. The Tunisian date sector

Date palm cultivation has developed over more than seven centuries in Tunisia. Traditional production systems have evolved considerably with the modernisation of irrigation techniques and borehole pumping systems. This evolution has benefitted from the development of export activities. New oases have sprung up in the Djerid and Nefzaoua areas, in the governorates of Tozeur and Kebili, respectively. This development has been accompanied by organisational changes in marketing, particularly following the liberalisation of packaging and export activities. This dynamic has resulted in an increase in production, which testifies to the part played by the date sector in the Tunisian economy today. Production, which has been growing steadily since 1975, reached 331,500 thousand tonnes during the 2019-2020 season (ONAGRI, 2022). At an international level, Tunisia ranks third, with exports estimated at US\$ 255,900 (ITC, 2022). The sector is also an important source of income, thanks in particular to its high market value in the southern regions of Tunisia (Zouhair *et al.*, 2020). Date production is carried out by small farmers who own small palm groves ranging from 0.5 to 3 hectares (Khamassi, 2015). The oases are concentrated in four governorates: Gabès, Gafsa, Kebili and Tozeur, which are home to 10% of the Tunisian population. Closely affected by climatic factors, these regions face drought, which accentuates the financial precariousness of growers, who also have to contend with a low-skilled workforce.

Farmers usually sell their produce in one of two ways. The first is the sale of standing crops, with a price based on an estimation of the average palm tree yield. Sorting, harvesting and transport are the responsibility of the collector. This type of transaction involves risks for the collector, based on the quality of the dates, the availability of volumes and their compliance with quality standards. The second type of transaction is the wholesale of tonnage. This type of transaction does not involve any risks for collectors, who can select the quality required by exporters and possibly obtain supplies from other collectors sourcing locally.

Packing is an important stage in the process of improving the visual and commercial quality of exported dates, particularly through disinfection, sorting and packaging. Finally, contracts, which are generally informal and oral, are an important part of transactions in the Tunisian sector.

3. The informal economy in the production and collection stages of the Tunisian date supply chain

From the 1980s onwards, the informal economy became a permanent fixture in the sector, notably through the illegal seizure of new land, which simultaneously generated a substantial increase in potential and an alternative production system that benefited from state subsidies. The public development of hydraulic infrastructures has undoubtedly played a catalytic role in the expansion of palm groves, especially in the Kebili region. As a result, these expansions, which take advantage of illegal and control-free access to water, total an area four times larger than the one legally irrigated in this region (Mekki *et al.*, 2021). These palm groves are tolerated by local authorities because they contribute to a public strategy geared towards an intensive agricultural model.

The literature shows that the incentives for formal producers to subcontract to informal stakeholders, and ultimately the degree of informal infiltration into the sector, depend on the level of specialization in the producer's agricultural activity. In particular, studies (Fusillier *et al.*, 2009; Gendre *et al.*, 2007) show how the choice of harvesting practices and the marketing strategies adopted by growers are largely determined by their specialization. Unlike producers in Kebili who are specialized in the production of dates, in Djerid (Tozeur), date production is generally not the only activity of producers. The latter have other, more stable sources of income from non-agricultural activities. Since they do not work full-time, these farmers are in contact with collectors, most of whom operate within informal channels, which means that informality plays a significant part in the sector.⁵

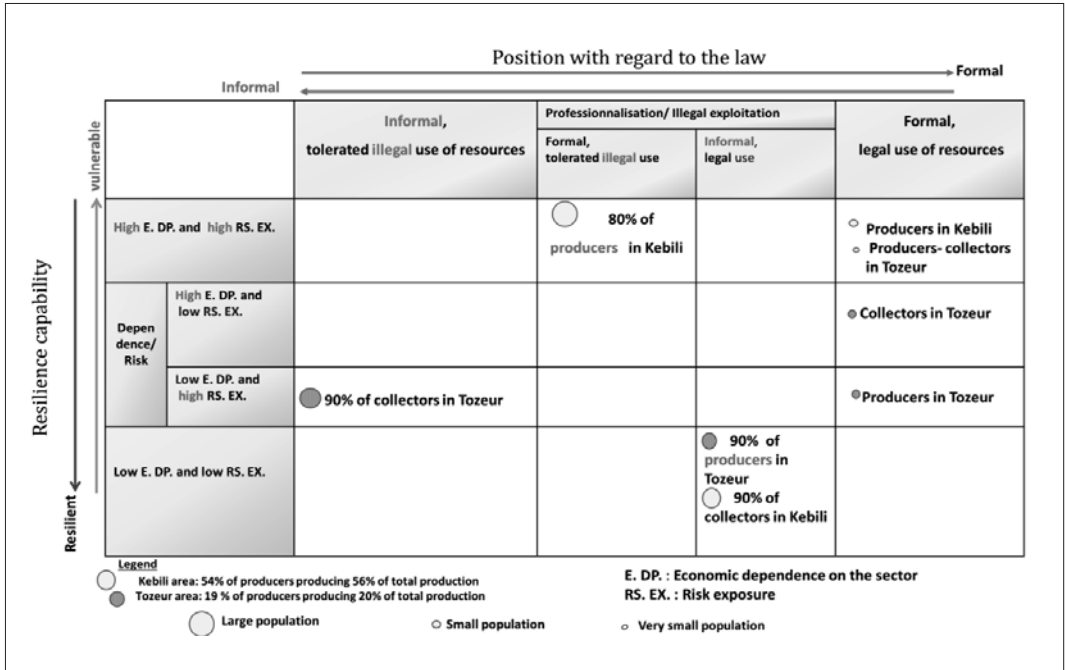
In the date value chain, collection is the activity the most integrated into the informal economy. In the Kebili region, collectors are simple intermediaries remunerated via fixed commissions. The dependence of local producers on collectors is limited to establishing links with exporters and packers through a wholesale price indexed to the export market price. These informal collectors have long-term relationships with some exporters-packers. In the, Djerid, collectors collect, sort, quality control, store and transport the product.

Figure 1 shows a typology of stakeholders based on two dimensions: the relationship between operators and the law, and their resilience capability. The first dimension reflects the lack of professionalization and the degree of informality in the activity of operators (Hugon, 2014). Informality can be defined by the need for lower costs, the low barriers to entry in terms of qualifications, and the funds required (Pesqueux, 2012). The second dimension deals with the resilience capability and reflects the capacity to face disturbance and maintain its controls (Holling, 2001).

The resilience is widely used with the concept of adaptive capacity to characterize the potential of enhancement of the operator's ability to cope with crisis. In Figure 1, we refer to the degree of the operator's vulnerability through its defenselessness (Chambers, 1989) i.e., a lack of means to face a crisis without loss. Two sides characterize vulnerability: an external side relating to the shocks to which a system is exposed and an internal one representing the capacity to recover from external disturbances (Chuku and Okoye, 2009). In examining the vulnerability of operators to shocks and crises (or its opposite, resilience), it is important to include these two sides. In our case, our assessment is based on the degree of specialization, distinguishing specialized versus diversified (based on the dependence of operators on their main activity and on supply chain), and their degree of exposure to risks (market, climate and product). Besides, in the absence of credible and up-to-date informa-

⁵ There are both informal and formal collectors, but the proportion of informal collectors is the highest.

Figure 1 - Typology of stakeholders in the upstream phase of the chain.



Source: Authors.

tion, the mapping provides a general overview covering approximately 80-90% of operators in the two main production areas studied. We lack accurate data on the behavior and constraints imposed on other operators to be able to position them on the map, which justifies the blank cells in the matrix. Figure 1 puts the risks revealed by the crisis into perspective. This calls in particular to examine the impact of each criterion defining the operator's resilience capability.

Regarding specialization, it turns out that faced with the same high degree of external uncertainty, the formal producer of Kebili, who is mono-product and is highly dependent on the collector (strong specialization), tends to be more vulnerable to the crisis than an informal collector in Tozeur who has other sources of income and who is weakly dependent on the producer (strong diversification). So that, the crisis highlights a risk linked to the specialization of operators.

Moreover, Figure 1 shows how the crisis has affected all formal operators connected to informal operators, especially formal producers in the Kebili area, particularly vulnerable to external shocks.

The informal nature of the partner in the supply chain increases the risk of experiencing opportunistic behavior which accentuate its vulnerability.

A stakeholder's decision to enter the supply chain informally depends on the level of incentives. Table 1 shows the benefit that producers or collectors derive from informal activity and the costs that they can bear. It describes the impact of a stakeholder's decision to engage in informal activity on the other operators within the chain, as well as on the community (the State).

The Table 1 shows that all stakeholders benefit from informality such as lower unit costs, tax avoidance, and greater flexibility in choosing partners in the absence of contractual commitments, but that they also bear costs that may be implicit or latent over the long term (lack of skilled labour, cost of access to water, decline in date quality) or in the event of crises. The public authorities also benefit from informality by reducing poverty, increasing the competitiveness of dates and boosting export volumes. However, they bear the social cost of managing water stress, the loss of income in terms of so-

Table 1 - Cost/benefit analysis of informal participation in the date value chain.*

	Informal stakeholder		Other stakeholders within the chain		State	
	Private costs	Private benefits	Private costs	Private benefits	Social costs	Social benefits
<i>Producer</i> Informal use of resources	<ul style="list-style-type: none"> - Audit penalties - Unsustainable relationships - Risk of opportunism 	<ul style="list-style-type: none"> - Lower costs - Increase in production 	<ul style="list-style-type: none"> - Disruption to irrigation - Overproduction and lower prices - Poorly qualified workforce - Ratchet effect** 	<ul style="list-style-type: none"> - Low downstream dependency 	<ul style="list-style-type: none"> - Water wastage and salinisation - Poor planning of the distribution of agricultural land - Loss of income from social security contributions and poor targeting of assistance programmes 	<ul style="list-style-type: none"> - Increase in exports - Reduced poverty in the short term - Lower production costs and improved competitiveness
<i>Informal collector</i> No official registration or contractual agreement	<ul style="list-style-type: none"> - Financing the pre-production phase - Risk of speculation 	<ul style="list-style-type: none"> - Subsidised equipment - Tax avoidance - Flexibility and diversification 	<ul style="list-style-type: none"> - Weakening of producers' bargaining power - Disengagement of unregistered collectors - Dependence on exporters 	<ul style="list-style-type: none"> - Pre-production financing - Shared market and climate risk - Stable and regular supply at a competitive price 	<ul style="list-style-type: none"> - Loss of earnings (registration fees) - Inadequate targeting of profiles*** 	<ul style="list-style-type: none"> - Marketing and employment without depending on the State

* The Table is based on discussions at Round Table 2 of the FOPRODATTE forum (Loukil and Rouached, 2022).

** The ratchet effect reflects the impossibility for actors to change the rules of informal land or water use, which become a given for informal producers.

*** Informal actors don't pay social security contributions, but at the same time benefit from social assistance programs due to a mistake of inclusion, since in principle they don't belong to the target category.

Source: Authors.

cial security contributions, and the disruption to agricultural production planning which, with the impact of climate change, is likely to pose a real problem for food security.

4. Effects of the informal economy within the supply chain

The existence of the informal economy in the various activities of the sector, and in particular in the collection activity, has consequences for the operation of the chain, as shown in Table 1, in terms of costs incurred, horizontal competition (between collectors), vertical competition (with suppliers and downstream exporters-packers), and the volume and quality of the final offer.

Effects on costs and supply

On the supply side, the presence of speculators in the largely informal collection activity can contribute to a significant gap between overall supply and demand (local and for export) during periods of high production. In this context, collectors who have benefited from public funding for the acquisition of storage equipment, obtain supplies at low prices during the harvest period and resell the product at a much higher price during periods of high demand (Ramadan, end-of-year festivities, etc.).⁶ The average production cost of dates in the formal economy, estimated at between € 0.80 and € 1.1 per kg, is now competing with the cost associated with informal production. Similarly, informal stakeholders involved in collection are more competitive than their formal competitors. They ultimately have a relatively comfortable profit margin. This competitive advantage is largely due to the low cost of acquiring informal production factors.

Subcontracting operations are carried out by informal operators who, without paying taxes, have access to input (crates, protective bags and

nets) subsidised by up to 50%.⁷ These well-financed operators also handle the harvest and high-volume logistics. Formal collectors face unfair competition, which prevents them from implementing the investment strategies they need to adapt to the demands of international markets.

Impact on traceability and product quality

For any approach to promoting products through quality, and in particular for food products, traceability is a central issue. It requires the identification of operators and their commitment to comply with precise requirements. Consequently, when the value chain is infiltrated by informality, the compliance of informal operators and thus traceability are no longer ensured. This is generally the case of the date value chain which, in the absence of providing guarantees of product traceability cannot display a qualitative advantage that could justify a better selling price. More precisely, the incentive to meet the importers requirements, is hampered by the presence of informal collectors. In fact, such incentives rely on the transmission of information about market expectations from downstream to upstream. The only information transmitted concerns volume requirements (and not the quality). The informal collector may therefore have negative effects on the formal producer by making it difficult to adapt to international requirements (Rouached *et al.*, 2023). In addition, the absence of an adequate producer price encouraging quality improvement leads operators to focus their efforts on maximising volumes of a basic quality standard (Fusillier *et al.*, 2009; Gendre *et al.*, 2007). This leads to the commoditisation of exported products. The informality prevalent in the upstream deprives operators of the opportunity to benefit from a negotiated sales price indexed to high certified quality. Thus, upstream prices are

⁶ Production is expected to reach 400,000 tonnes by 2025 (ONAGRI, 2022), with a loss rate of 25 to 30%. In the absence of official data on national date consumption, an extrapolation based on per capita consumption, put forward by an international date expert, has made it possible to a wastage rate of around 45%, well above the FAO figure of 25% (Round Table 1, FOPRODATTE Forum, Rouached and Loukil, 2022).

⁷ As part of the public policy of extensive agricultural growth and aimed at protecting production against borer attacks, the institutional partner, the *Groupement Interprofessionnel des Fruits*, offers inputs at reduced prices (Gendre *et al.*, 2007). In the absence of an official professional card, these practices are not discriminatory.

Table 2 - Evolution of date exports in Tunisia (2017-2021).

	2017	2018	2019	2020	2021
Date exports (US dollar)	229,990	281,792	265,875	261,735	255,900
Date exports (in tonnes)	104,357	124,019	113,987	109,267	118,666

Source: ITC, 2022.

aligned with spot market prices based on criteria other than those required by importers. Furthermore, in the absence of a contract governing exchanges between operators (especially informal ones), the price criterion is favoured over the quality criterion.

Impact on natural resources

Over and above the short-term effects of informality, studies (e.g. Alvarado *et al.*, 2022) have shown how informal activity increases the long-term risks of environmental degradation and the depletion of natural resources. Tunisia, which is in a situation of extreme water stress, is a textbook case of this process. In fact, the existence of an informal economy in the sector exacerbates the already inefficient management of water resources, which is likely to compromise the resilience of the industry in the long term. In Southern Tunisia, according to the national report on the water sector (2020), 96% of the total volume of groundwater is used for agriculture and, 81.5% of water points in deep aquifers are illicit (statics for 2019). This situation not only affects water quality, which results in soil salinization and lower soil productivity, but also the ability of managers to maintain and repair the network. Illicit pumping represents a loss of revenue for the Tunisian state, which does not collect royalties on the irrigation water used. Illicit water use is also reflected in an increase in non-payment of royalties in the formal distribution, a phenomenon that has intensified since the 2011 revolution, as well as in clandestine connections. This in turn leads to the deterioration of irrigation infrastructures and a deterioration in the quality of dates and agricultural produce. In addition, Tunisia's irrigation policy,

which sets relatively low-price levels, provides a strong incentive to adopt irrigated farming (National Water Sector Report, 2020). The average price of water for irrigation is estimated at 0.110 TND⁸/m³, whereas the actual price in southern oases is 0.028 TND/m³. As this price only partially covers water service costs, it does not allow for the optimal allocation of resources and is an incentive to produce in terms of volume without adjusting supply (in terms of both volume and quality). However, cost-based pricing would run the risk of excluding small farmers.

In the long term, the presence of an informal sector that uses water resources without public control is likely to undermine the sustainability of the date export sector and food safety.

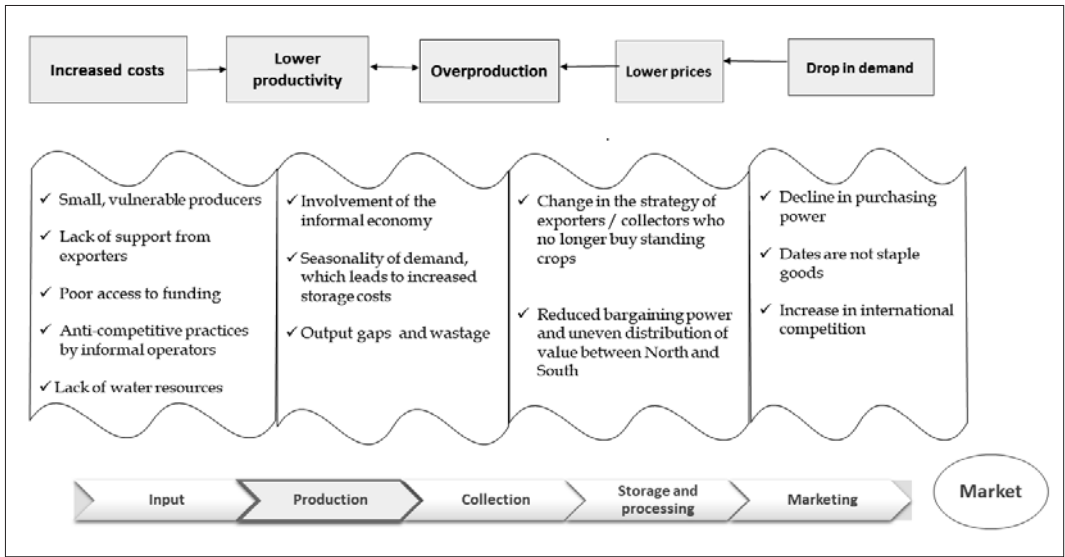
Today, public policies tend to accommodate the current situation by supporting the development of existing operations and to combat all forms of new illegal land expansion. However, the major problem concerns illegal private boreholes, which are responsible for the over-exploitation of water resources. Given the difficulty of monitoring and control by local authorities, and the failure of associations to manage resources, thought should be given to new mechanisms for the collective governance of resources along the lines of "common pool resources" (Ostrom, 1990; Farolfi *et al.*, 2022). The introduction of management rules and approval mechanisms would limit the over-exploitation of water resources.

5. Informal economy during the Covid-19 crisis

The Tunisian date sector was considerably affected by the Covid-19 crisis. Simultaneous

⁸ 1 TND (Tunisian dinar) = 0.32 USD

Figure 2 - Impact of the Covid-19 crisis on the Tunisian date sector.



Source: Authors.

shocks to supply and demand have affected the entire supply chain (see Figure 2). Tunisian exports, which represented around 40% of production, fell in value over the 2020-2021 period (see Table 2). From the point of view of local consumption, dates, which are not a staple product, suffered a drop in demand, which generated a stock of unsold products and a fall in prices.

In addition, sanitary containment measures (airport closures, inter-city travel bans, market closures, etc.) have increased packaging and transport costs. They have also caused a distribution problem that has been exacerbated by the heavy involvement of the informal economy in intermediary activities. As a result, the majority of informal transactions could not be maintained. In the absence of buyers, the dates could not be harvested. Small farmers were directly affected, as they were forced to assume the risks of their activity.

Even though formal stakeholders in the intermediation branch were affected and weighed on the sector's performance during the crisis, the disengagement of informal collectors and

the loss of informal labour undoubtedly had a greater impact on supply systems. During the confinement period, travels between regions are reserved for workers with official authorization.⁹ The inability of distant informal workers to travel (Koussani and Khamassi, 2022), generated additional costs, due to the use of more expensive formal labour. This has automatically pushed up all prices of the supply chain. Excess supply upstream has exacerbated the imbalance of power between stakeholders in the chain, to the detriment of producers, resulting in a drop in quality, a reduction in producers' bargaining power and an even more inequitable sharing of value within the value chain. Finally, in a theoretical study, Aziez *et al.* (2022), show how the disengagement of the informal economy from the marketing intermediation link can have an impact on the intermediate prices ratio between low and high quality dates to the detriment of good quality dates whose extent of the price drop is greater.

It is important to note that some informal collectors who usually buy dates on the vine have given up this activity with the onset of the crisis.

⁹ Government decree no. 2020-156 prohibits the circulations of operators without an official registration in the trade register.

This opportunistic behaviour was possible since transactions are generally carried out without a contract. Oral agreements then simply broke down. The disengagement has deprived the sector of usual investments, especially since these collectors usually finance the collection and transport operation by providing the material and equipment for storing the product. Moreover, when it comes to small collectors, the crisis has led the majority to a state of bankruptcy and pushed them to leave the sector. As a result, producers who could not bear the cost of these harvest and post-harvest operations were forced to let the product rot on the vine.

The existence of oversupply and unsold stocks among producers benefits the stakeholders who remain in business, in particular collectors, packers and formal exporters, whose bargaining power has increased compared with the pre-crisis period. A halt in the activity of informal collectors has affected the financial situation of producers in two ways: on the one hand, they have lost income due to the lack of outlets and uncompensated production costs, and on the other, their bargaining power vis-à-vis their customers (collectors or exporters, depending on their marketing channel, see Figure I in Appendix 2) has deteriorated.

6. Lessons and recommendations

The complexity of interactions in the context of transactions between the formal and informal economies reveals the need for an integrated, multidimensional strategy aimed as much at strengthening the capacities of formal stakeholders as at controlling the degree of infiltration of informal stakeholders and the balance of power between stakeholders in the date sector, without upsetting the sector's organisational balance in the short or medium term. We present below a number of options that can satisfy both short- and medium-term as well as long-term objectives: in the short and medium term, to provide a framework without adversely affecting the current organisation of the sector, and in the long term, to reduce to a bare minimum, or even eradicate, the influence of the informal economy on the organisation of the sector.

Increasing the bargaining power of producers

The interviews carried out with professionals in the sector (producers, heads of producer organizations, packers) (see Appendix 1) confirm the disengagement during Covid, of a certain number of informal actors in collecting and packaging activities reducing the competition in the intermediate links and leading to a more power for formal collectors vis-à-vis producers. The presence of the informal sector therefore appears to be a significant factor in the balance of Upstream-Downstream forces.

Thus, formal producers could be the most vulnerable in the event of a crisis, due to the unfavourable bargaining power. The small size of their farms, the limited diversification of their activities and the difficulty of accessing funding accentuate their vulnerability by weakening their resilience capability in the event of a crisis. Public authorities need to strengthen their credibility regarding funders and their negotiating power regarding intermediaries (collectors, packers). One solution would be to encourage the organisation of supply through producer grouping schemes, in order to reduce costs through pooling, and mitigate the impact of external shocks. In addition, these schemes are a way of strengthening producers' bargaining power, which in the event of a crisis ensures better access to the market. Experiments with farmer groups have demonstrated their effectiveness in increasing producers' incomes, by promoting the adoption of new technologies and reducing costs (Tran *et al.*, 2023; Blekking *et al.*, 2021). Today, however, Tunisian farmers' membership of these collective structures is still low. There is an urgent need to improve the attractiveness of professional organisations by strengthening their internal governance capability and raising farmers' awareness of the benefits of grouping together.

Offering producers alternative funding to the informal financing system

Some informal collectors have considerable financial capacity, and are able to carry out crucial functions such as standing crop sales as well as bearing the risks associated with this mode of transaction, packaging and logistics. Despite

the contribution of the informal sector to farmers' funding, it is crucial to reduce the impact of informal collectors by implementing alternative funding mechanisms. The Covid-19 crisis has revealed opportunistic behavior on the part of a large majority of collectors who have withdrawn from their usual financing of the sector, leaving producers alone to suffer the losses resulting from the closure of borders and markets. Several research studies (Ohnsorge and Yu, 2022; Capasso and Jappelli, 2013) confirm that the development of the funding system leads to a reduction in informality. In Tunisia, agricultural loans do not exceed 5% of business loans (BCT, 2023) and private investment is based more on self-financing. Small farmers' overdue and unpaid loans represent a barrier to access to funding, exacerbated by the fragmentation of land ownership, which forces them to turn to the informal financing system. Financial cooperatives can contribute to the diversification of financial services by offering products tailored to small farmers, thereby promoting their financial inclusion (McKillop *et al.*, 2020).

The resilience of the date sector also depends on the existence of an appropriate agricultural risk management policy (climatic risks and market fluctuations). In this respect, insurance is a key element, especially as the agricultural sector's share of insurance is currently marginal (estimated at 3% of the insurance sector in Tunisia, ADB, 2016).

Professionalising the collection business

Reducing the power asymmetry throughout the value chain can be achieved through initiatives aimed at grouping collectors into collective structures. These structures could help to strengthen guarantees of product traceability. However, implementing this structural solution raises the need to properly define the mode of governance. The failure of the attempt to professionalise the collection activity through the use of professional credentials shows the need to initially identify an official affiliation body for

these operators. One solution would be for a core group of formal collectors, supported by public authorities, to join forces and create a model, a kind of "success story" that could attract not only other formal collectors but also, gradually, informal collectors, who would see the advantages of collective coordination outweigh the advantages of informality. Such an approach would contribute to the contractual governance of transactions, which is a priority. It would also consolidate product traceability and reduce quality risk, while avoiding losses. The introduction of a private certification for the collection stage will certainly help to meet this objective.

Promoting the territorial dynamics of oases

The issue of farmers' dependence and vulnerability, which stems from a lack of diversification, needs to be considered in the context of a more global reflection on the dynamics of rural areas and their contribution to economic development (Bechir *et al.*, 2022; Carpentier, 2017). Intercropping and diversification in the oases, as well as tourism, craft and cultural activities, provide farmers with additional sources of income, thus enabling them to reduce their dependence on date production. Incentives should be aimed more at creating value in the date sector according to quality, while considering the rational use of resources, rather than to a volume-based strategy for low-quality products. To meet this challenge, the economic model needs to be based on a more in-depth analysis centred on sustainable development strategies that help preserve natural resources.¹⁰ Diversification through the development of new varieties reduces the environmental impact of monoculture. Similarly, diversification through processing helps to combat loss and wastage by increasing the shelf life of products.

Fight against voluntary and involuntary informal work

Actions to support workers into formal employment should be targeted according to whether the choice to remain in informality

¹⁰ The rise in the salinity of irrigation water is a red flag for the risks of a drop in quality and, in the medium term, in price.

is involuntary or voluntary. In the absence of decent employment opportunities, informality can be involuntary due to the seasonal and occasional nature of agricultural work and low levels of education. The absence of a social security system specific to the agricultural sector means that employees are excluded from the formal labour market if they cannot prove that they have worked for the same employer for at least 45 days per quarter. The conditions of access to the social security scheme for agricultural employees should be made easier (Law 81-6 of 12 February 1981) to encourage affiliation.

Consider now workers who voluntarily choose informality. Public action has to review assistance programmes, currently insufficient to reduce the disincentive to formal work (UNDP-ILO, 2022). There are two types of costs involved in giving up informality: social security contributions and loss of income in terms of social benefits financed by assistance programs for vulnerable categories. Moreover, paying social security contributions does not guarantee quality of care or a higher retirement pension than social benefits. This explains the failure of the AHMINI programme for rural women in Tunisia, as evidenced by the low take-up. Integrating the informal sector therefore requires making social security schemes more attractive by improving the quality of care for members of the agricultural sector.

7. Conclusion

Tunisia experienced a sharp recession in 2020, with economic growth falling by 8.8% (World Bank, 2024). The Covid-19 health crisis undoubtedly played a role in this economic crisis. In the agricultural sector, and the date sector in particular, it has highlighted the role of the informal sector, which, by suddenly disappearing, due notably to the confinement measures and the closure of borders, has paradoxically led to the paralysis of the sector. The lack of a formal commitment has accelerated the disengagement of some informal collectors, who typically buy on the hoof and finance equipment to protect production and collection.

At the same time, informality largely contributes to the sector's low resilience in times of crisis. The accompanying measures adopted by the public authorities cannot effectively target informal actors leading to the bankruptcy of some small informal collectors. Thus, the interaction of the informal economy with official channels can generate effects that may seem paradoxical. Indeed, formal activities can develop resilience to exogenous shocks thanks to large volumes of informal trade generated through concealment practices (i.e. informality) or in the context of interactions with informal activities (suppliers, customers, etc.) with its vast, efficient and well-organised network. In such a context, the absence of a clear boundary between the two formal/informal systems makes it even more difficult for public authorities to control informal practices. The significant contribution made by this sector to value creation in the formal economy may partly explain the relative caution of public authorities in implementing measures aimed at completely eradicating the informal economy. As a result, a large number of economic stakeholders perceive the lack of public action in this area, as well as the ambiguity of the authorities' position towards this sector, as a sign of their unwillingness to eradicate the phenomenon.

However, the informal economy has high social costs: wastage of water resources through illicit extensions, reduced capacity to transfer knowledge to the formal economy and biased economic indicators. Reforms designed to support the informal economy must be defined through public policies that take account of these long-term social costs. However, the radical position of seeking to completely eradicate the informal economy is controversial.

Developing countries, and Tunisia in particular, have a greater interest in adopting a strategy based on supervising informal activities, especially when the latter contribute to a country's economic performance and offer significant potential that should be exploited. In this sense, public initiatives to integrate the informal economy are likely to create more jobs and boost GDP growth.

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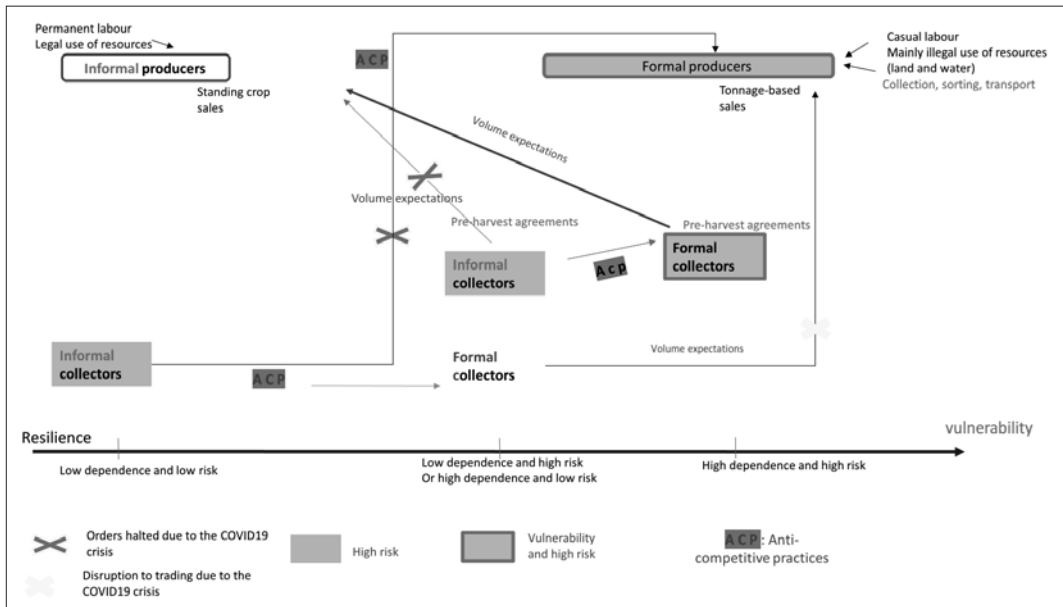
Appendix 1 - Material and methods

Table 1 - List of panellists and topics discussed in the FOPRODATTE forum (2022).

Panelists: 1-Regional Director of the Interprofessional Date Group, Tunisia, 2-General Director of processing dates company, Algeria, 3-Consultant, Manager & International Expert in Dates, Tunisia, 4-Consultant, specialist in contract agriculture, Tunisia., 5- Scientific Researcher, Morocco, 6-Food development researcher, Date exporter, Tunisia, 7-Researcher and technical advisor to the agricultural sector support program, Algeria, 8-Scientific Researcher, Tunisia, 9-Expert in monitoring, evaluation and control of takeover bids, Tunisia, 10-President of the Chamber of Date Exporters, Tunisia, 11-Expert in financing agricultural value chains. Tunisia, 12-Technical assistant, Chamber of Commerce, Morocco.		
Topics discussed	Code	Category-Theme
T1: Difficulties and challenges encountered by the Tunisian date sector.	Dependence and specialization	Resilience Capability- Vulnerability
T2: Eventual link between strengthening requirements, price, and product profitability.	Risks and uncertainty	
T3: Criteria for the assessment of the performance of the date value chain (DVC).	Auto-organization ability and adaptability	Law and regulation- Informality
T4: Extent and impact of informality on the DVC.	Adaptability and conformity	
T5: Roles of the operator's type and partnership relationships in the DVC.		
T6: Impact of the COVID-19 crisis on the DVC's demand and supply.	Impact	Covid19-crisis
T7: Improvement of public intervention for strengthening the resilience the DVC.	Improvement in ability	Governance- Resilience
T8: The role of financial institutions in improving the resilience of the DVC.		
T9: Strategies and public policy to deal with informality: accommodation, integration, others.	Improvement in capability	Capacity Building- Resilience
T10: Contribution of contract farming for strengthening the capacity of the upstream sector.		
T11: Perspectives from market diversification and varietal differentiation.		

Appendix 2

Figure 1 - Impact of the Covid-19 crisis on transactions and operators in the date value chain.



Source: Authors.