

Evaluation of the Fruit Tree Productivity Project in Morocco: Final Report on the Catalyst Fund Activity

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LIST OF ACRONYMS

ANGIEO	<i>Association Nationale des GIE d’Olives</i>
APP	<i>Agence de Partenariat pour le Progrès</i>
APO	Asian Productivity Organization
ASM	<i>Avance sur Marchandises</i>
CAM	<i>Crédit Agricole du Maroc</i>
ERR	economic rate of return
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
FTTP	Fruit Tree Productivity Project
GIE	<i>Groupement d’Intérêt Economique</i>
IOC	International Olive Council
KII	Key Informant Interview
MAPM	<i>Ministère de l’Agriculture et de la Pêche Maritime</i>
MCC	Millennium Challenge Corporation
NORC	National Opinion Research Center
SIAM	<i>Salon International de L’Agriculture au Maroc</i>
UNOPS	United Nations Office for Project Services
USGAV	<i>Unité de Soutien aux GIE et d’Appui à la Valorisation</i>

EXECUTIVE SUMMARY

As part of a \$697.5 million compact between the Millennium Challenge Corporation (MCC) and the Government of Morocco that was signed in 2007, MCC funded a \$340.5 million project to support the country’s agricultural sector—the Fruit Tree Productivity Project (FTPP). The FTTP comprised several activities that sought to expand the production of selected tree fruit crops—olives, dates, figs, and almonds—and address constraints along these value chains. The *Agence de Partenariat pour le Progrès*, a public Moroccan entity, implemented the Compact between 2008 and 2013.

MCC contracted with Mathematica to evaluate several components of the FTTP. This report presents the findings from the final evaluation of one of the FTTP activities: the Catalyst Fund activity. This activity partially funded the construction and provision of equipment to 20 modern olive oil processing units run by second-order producer organizations (cooperatives of cooperatives, known as *Groupements d’Intérêt Economique*, or GIEs). The GIEs were expected to purchase olives from farmers through their cooperatives, crush those olives to produce high-quality olive oil, and sell the oil under the GIE’s brand. Profits from olive oil sales would be returned to farmers, supplementing the initial payment for purchasing their olives and contributing to increasing their incomes.

A. Research questions and evaluation design

The evaluation of the Catalyst Fund activity sought to answer the following research questions:

Research questions

1. To what extent are the GIEs established by the Catalyst Fund operating as intended? To what extent are farmers in the GIEs’ catchment areas participating in cooperatives that are members of the GIEs, and why?
2. How, and to what extent, does the level of success vary across GIEs? What factors facilitate or inhibit the successful operations of GIEs?
3. How did the Catalyst Fund processing units affect farmers’ revenues from olives (total and per tree), total agricultural revenues, and household income? Did these effects vary by farmer characteristics such as sex, age, and pre-project revenues?
4. Which international quality benchmarks does the olive oil produced by the Catalyst Fund processing units meet?
5. Besides making modern processing units available, what role have the GIEs played in the development of olive oil processing and marketing? Have GIEs been able to identify new markets and obtain better prices for olive oil, and how have they done so?
6. Have the new GIEs managed to repay the credit used to help fund the establishment of the new processing units? To what extent have they been successful in accessing and repaying additional short- and long-term credit to operate effectively?
7. What types of government or other external support have the GIEs needed and received to sustain them? What additional support will they need (if any), and will they be able to obtain it?
8. Are the Catalyst Fund processing units likely to be sustainable in the long run?
9. To what extent has the GIE/processing unit model been replicated outside project areas and to what degree is that attributable to the Catalyst Fund?

To answer these research questions, we conducted a mixed-methods performance evaluation, which included the following three components:

- A **qualitative component**, which drew on focus groups and interviews with key stakeholders, including farmers, cooperative leaders, and GIE presidents. Most of these interviews and focus groups were conducted in early 2019; in almost all GIEs, this was five or six crushing seasons after the units had started to operate. (The crushing season typically starts in October or November and ends in December or January.)
- A **quantitative component**, which drew on two rounds of a survey conducted with the leadership of the GIEs in late 2016 or early 2017 (covering the 2015–2016 crushing season) and in late 2018 (covering the 2017–2018 crushing season). In almost all GIEs, the second round of the survey covered the fourth or fifth crushing season since the processing unit was constructed. Of the 20 GIEs, 19 responded to the first round of the survey and 18 responded to the second round.
- An **olive oil testing component**, which involved collecting and testing olive oil samples from 16 of the 20 GIEs in late 2018 (at the start of the 2018–2019 crushing season) to assess the quality of the oil compared to international benchmarks.

B. Key findings

As of early 2019, the equipment at the GIE processing units was in good condition, but many GIEs lack permanent staff with sufficient skills and experience to manage the GIE.

All GIE presidents who were interviewed reported that the olive crushing equipment was still in good condition, and that they have been conducting regular maintenance of equipment as needed. However, the GIEs are typically managed by voluntary boards, whose members might lack the necessary skills and experience to perform well in their roles. The boards at some GIEs have changed frequently, leading to instability and a lack of continuity. A few GIEs have been able to hire a full-time manager or director as well as technical staff; however, most GIEs have been unable to hire permanent paid staff because the work is seasonal and they lack the funds to support a full-time position. Several national-level stakeholders suggested that differences in performance across GIEs can be attributed in large part to differences in the quality of the GIE leadership—especially the GIE president. Because the Catalyst Fund was introduced towards the end of the Compact, GIE leaders had to be identified quickly by member cooperatives, which in some cases might have resulted in unmotivated or uncharismatic leaders being selected.

Farmers are reluctant to sell olives to the GIEs because the GIEs, lacking working capital, are unable to pay them when olives are delivered.

Most farmers who participated in focus groups indicated that they required full payment from the GIEs for their olives up front, rather than waiting until the resulting oil was sold, because selling olives was their main source of income and they needed the money urgently. Short-term loans from *Crédit Agricole du Maroc* (CAM) were expected to serve as the source of working capital to enable the GIEs to purchase olives from farmers. However, GIE presidents reported that these funds are often received late in the season, towards the end of the calendar year, whereas they require these funds in August or September to secure the supply of olives for the upcoming

crushing season. These loans also have inconvenient conditions—including strict collateral requirements, high interest rates, and a complex mechanism for paying farmers—that make them unattractive to the GIEs. Overall, GIE presidents largely view these loans as insufficient to account for their working capital needs and view the limited provision of working capital as a major flaw in the post-Compact project implementation. Because the GIEs have limited resources to make up-front payments to farmers, many farmers prefer to sell their olives at the market or to intermediaries.

There is substantial variation across GIEs in the amount of olives purchased for crushing, but most are operating well below their capacity.

Overall, the 16 GIEs that purchased olives in 2017–2018 purchased an average of 329 tons of olives (a median of 174 tons). There was substantial variation across GIEs, with the amount purchased ranging from 10 tons to 1,400 tons. The total amount purchased is typically well below the crushing capacity of the processing units. Specifically, several GIE presidents indicated that the processing units could realistically crush an average of about 2,100 tons of olives per season—more than 6 times the average amount of olives they purchased in the 2017–2018 season.

Most GIEs purchase olives from farmer members and non-members because olive purchases from members alone are not sufficient to meet the GIEs' needs.

According to the 2017–2018 GIE survey data, in most GIEs less than 10 percent of farmer members sold olives to the GIE. A key reason for this, as discussed above, is that GIEs lack the working capital to pay farmers up front for their olives. As a result, many GIEs purchase olives from a relatively small number of farmer members with a large production volume who can afford to wait for payment until the oil is sold, as well as non-member farmers in a similar position.

Most GIEs are producing olive oil that would be classified as virgin or extra-virgin.

Among the 16 GIEs whose oil we tested, 9 GIEs produced extra-virgin olive oil, 4 produced virgin olive oil, and 3 produced ordinary oil. Most GIEs met extra-virgin olive oil standards based on chemical criteria, but some did not meet the sensory-related criteria, which are rated by a trained tasting panel. Where GIEs did not meet these criteria, it could be due to poor olive storage by farmers and/or non-ideal olive oil storage conditions at the GIEs. That said, most GIEs met the sensory-related criteria, and several have won competitive awards for taste, especially at the Morocco's major annual agricultural fair (*Salon International de L'Agriculture au Maroc*, or SIAM).

However, GIEs have struggled to sell the olive oil they produce and have large volumes of unsold inventory.

The project envisaged that the GIEs would achieve high profits by selling their olive oil in markets that olive farmers had traditionally not been able to access, such as domestic supermarkets, olive oil companies, or the export market. Some GIEs have succeeded in selling to these markets, but the volumes sold remain limited and are variable from year to year; few GIEs have long-term contracts with these types of buyers. Most GIEs had sold less than one-quarter of

the oil produced in the 2017–2018 season by the time the GIE survey was conducted in late 2018, at least nine months after the end of the season. One GIE president noted that, despite being stored in appropriate conditions, the quality of the olive oil begins to deteriorate after a long storage period, so that it becomes even more difficult to sell profitably.

GIEs’ olive oil might not be competitively priced on local and export markets, which is an important barrier to selling the oil.

GIEs might be struggling to sell their olive oil because it is not competitive on the Moroccan market, for two main reasons. First, there is strong competition from cheap imported oil. Second, the GIEs’ production costs are higher than costs faced by many other Moroccan producers. For example, many GIEs cover transport costs for olives, the processing unit’s advanced equipment uses a lot of electricity, GIEs must pay interest on loans for working capital, and they use more modern packaging and labelling. Although they produce higher quality oil than many of their competitors, many local consumers are not willing to pay a premium for this higher-quality oil and/or prefer the taste of traditionally-crushed olive oil. GIE-produced olive oil may also struggle to be competitive in some international markets given subsidies provided to domestic olive oil producers in some countries.

GIEs also lack experience in marketing and do not have a formal marketing strategy.

Several GIE presidents and cooperative leaders suggested that, in retrospect, the project should have had a more explicit focus on markets. This could have included providing additional technical assistance to the GIE leadership in marketing, devising a financial operating model that would enable the GIE to hire a manager with marketing expertise, and developing a comprehensive marketing strategy to develop and promote the GIEs’ brands of olive oil. Ideally, this marketing strategy would have established relationships and contracts with buyers at the outset (although it is unclear if that would have been feasible given that the GIEs were new to the olive oil market).

The GIEs have not yet substantively affected farmer income because they are operating at low capacity, have struggled to find profitable markets, and are still paying off the loans taken to establish their units.

None of the GIEs distributed profits (also known as dividends) to farmers in the 2017–2018 season, for three main reasons. First, the GIEs are operating well below capacity, so the volume of oil produced has been limited and costs have been high. Second, the GIEs have struggled to find markets to which they can sell their oil at attractive prices. Third, the GIEs have had to prioritize using profits to pay off the initial CAM loan used to establish the GIE. Specifically, the GIEs contributed 20 percent of the cost of establishing the new processing units, which comprised a contribution from member cooperatives (5 percent of the total) and a loan from CAM (15 percent of the total). The co-contribution from the GIEs, which was large in monetary terms, was designed to incentivize the GIEs and member cooperatives to devote a strong effort towards the success of the GIE. However, without exception, GIE presidents viewed the large initial debt incurred by the GIEs as a major flaw in the design of the activity, and most pointed to the servicing of CAM loans as one of the biggest obstacles facing their GIE. Specifically, the GIEs have faced challenges in terms of management, marketing, and cooperative engagement

that have limited their profitability; their modest profits have been used almost exclusively for debt repayments, precluding them from distributing dividends to farmers as they were designed to do.

Farmers have experienced modest monetary benefits from using tolling services at the GIE and from a more attractive market for their olives, even in the absence of dividends.

Many member and non-member farmers in our focus groups reported crushing at least a portion of their olives at the GIE for their own consumption, to distribute to friends or family, and for sale. Most farmers who used the GIEs' crushing services (also known as tolling services) expressed a high degree of satisfaction with these services. Farmers prefer crushing their olives at the GIEs compared to other units because it takes less time to crush the olives compared to smaller-capacity units, and because the oil yields and oil quality are higher thanks to the GIEs' modern equipment. (Given the challenges with purchasing olives and marketing olive oil, most GIEs rely on tolling to contribute a large share of their revenues, even though it is not very profitable.) In addition to benefitting from tolling services, farmers who sell their olives to the GIE despite the challenges with receiving up-front payments have benefitted in several ways: (1) free transportation of olives to market (to the GIE) and other complementary services; (2) an above-market price for olives, in particular for olives that have a high yield of oil; and (3) the GIE is perceived to deal with farmers more fairly than do other buyers.

Many stakeholders also believe that the GIEs have contributed to a new culture of quality among olive farmers.

The FTTP contributed to this new culture of quality both through the establishment of the GIE crushing units (with their focus on producing high-quality olive oil) and the provision of complementary technical trainings for olive farmers (which focused in part of increasing the quality of olives produced and how to preserve quality until the crushing stage). As a result of these interventions, farmers have become increasingly aware of (1) appropriate harvesting techniques; (2) correct storage and transport of olives; (3) the importance of crushing soon after harvest; and (4) the high potential value of olive production. Stakeholders suggested that this might have contributed to an overall improvement in olive and olive oil quality, although the effect on farmers' incomes has been limited (in large part because of an absence of attractive markets for high-quality oil).

To succeed in the long term, GIEs will have to repay their debts, find new markets, and secure working capital; it is also important for them to diversify their activities.

The likelihood of the GIEs being sustainable in the long term depends on their ability to distribute dividends to member cooperatives. Until then, member farmers are likely to remain discouraged and engagement with the cooperatives will remain limited, and the GIEs will struggle to recruit additional active members. To distribute dividends, the GIEs will have to overcome their debt obligations so that profits are available for distribution. This is also important for the GIEs' broader financial sustainability; most of the GIE presidents that we interviewed reported being able to cover their operational costs, but only some are able to service their CAM debt obligations. The GIEs also need to increase their production and profits by finding attractive and reliable markets and securing enough working capital. Several GIE

presidents suggested that it was also important for the GIEs to diversify their activities, which would extend the GIEs' typical operating season beyond the current two or three months and enable them to access new revenue streams. This could also enable the GIEs to attract and retain higher quality staff—especially professional managers—by offering higher salaries and more stable jobs.

C. Lessons

The program logic suggested that the Catalyst Fund activity would increase farmers' incomes by purchasing their olives, producing and commercializing high-quality olive oil, and returning the profits to farmers. However, we found that the envisaged effects on income have not occurred.

Our findings suggest several lessons for the design and implementation of similar projects in the future, both in Morocco and elsewhere. First, the funding model for establishing new postharvest processing units needs to be carefully considered, especially in terms of co-contributions and working capital. Our findings suggest that the level of the co-contribution from the GIEs was too high. (This co-contribution was high in monetary terms despite representing only 15 percent of the capital costs of establishing the processing units.) Rather than serving to motivate the GIEs and their member cooperatives, this led to them being discouraged at the outset because the GIEs' modest profits have been used for debt repayments rather than being distributed as dividends to farmers. Further, it might have been important to improve access to working capital as part of the basic funding or operational model. Given the other challenges facing the GIEs in terms of management, marketing, and cooperative engagement, a different funding model would not necessarily have guaranteed their long-term viability but might have increased its likelihood.

Second, a more comprehensive focus on marketing of processed products is critical, even when the products are of high quality. Our findings suggest that, although most GIEs were producing high-quality olive oil, many were struggling to sell the oil at profitable prices given their relatively high production costs and the limited appreciation for high-quality oil on the Moroccan market. The GIE leadership also lacked the necessary skills and experience in marketing and needed additional external support, ideally tailored to their individual situations.

Third, encouraging cooperation among farmers often involves major behavior change, and needs an early and intense project focus. More time and support may have been required to explain how farmers—who were not used to cooperating to commercialize their products—were expected to engage with cooperatives and the GIE, build farmers' trust in cooperatives, and overcome socio-cultural obstacles to engaging with cooperatives. Similarly, cooperative leaders may have needed more time and support to understand how the GIE was supposed to operate and how they were expected to engage with the GIE and with farmers—especially for cooperatives that were newly-created or new to the olive sector. This was especially challenging given that the Catalyst Fund was only introduced towards the end of the Compact. It is important for future projects to be realistic about the difficulty of behavior change among farmers and to devote project resources and time to behavior change.

I. INTRODUCTION

Development of the agricultural sector has great potential to reduce poverty and increase pro-poor economic growth in developing countries (Ligon and Sadoulet 2018). Morocco is especially well-placed to reduce poverty through agricultural development because the agricultural sector directly employs almost half of the country's population (World Bank 2019). The population in rural areas of Morocco, where the poverty rate is three times higher than in urban areas and most of the population depends on agriculture for survival, has the most to gain. Agricultural development focused on smallholder farmers, who make up most of Morocco's farmers, may help reduce poverty (MAPM 2020; Hazell et al. 2007).

However, the agricultural sector in Morocco—and the Middle East and North Africa region more broadly—has grown more slowly than other sectors over the past four decades (Christiaensen et al. 2011). Key barriers to agricultural development include water resource scarcity and mismanagement, low labor productivity, and poor access to markets and value-adding technologies (Adeyemo and Okoruwa 2018; Pratt et al. 2018; Independent Evaluation Group 2017). Combined with a rapidly growing labor force, these barriers have resulted in high unemployment rates in rural areas, exacerbating rural poverty and accelerating migration to urban centers.

In 2008, the Government of Morocco introduced the *Plan Maroc Vert* (Green Morocco Plan), an ambitious initiative designed to modernize the agricultural sector and turn it into a key driver of economic growth by 2020 (*Ministère de l'Agriculture et de la Pêche Maritime* [MAPM] 2008). The plan included a wide range of projects, funding mechanisms, and policy reforms that focused on increasing agricultural production, improving the competitiveness of Moroccan agriculture in international markets, increasing the incomes of smallholder farmers, and supporting sustainable rural development (Faysee 2015). It strongly emphasized supporting and developing specific value chains, defined as the set of actors involved in the production, processing, and marketing of an agricultural commodity. These value chains include tree crops—for example, olives, dates, almonds, and figs—which are high value-added exports with potential to generate large profits for farmers. By encouraging farmers to transition from low-value cereal crops to high-value tree crops and supporting improvements to the production of existing high-value crops, the plan sought to facilitate improved productivity and product quality, and increase and stabilize farmer incomes in poor rural areas.

In line with the *Plan Maroc Vert*, the Millennium Challenge Corporation (MCC) funded a \$340.5 million project in the agricultural sector—the Fruit Tree Productivity Project (FTTP), implemented by the *Agence de Partenariat pour le Progrès* (APP), a public Moroccan entity. This project was part of a broader \$697.5 million five-year MCC compact signed with the Government of Morocco in 2007, which also included four other projects focusing on different sectors of the economy: the Small-Scale Fisheries Project, the Artisan and Fez Medina Project, the Financial Services Project, and the Enterprise Support Project. A sixth component, the Functional

Literacy and Vocational Training activity, was added later. APP implemented the Compact between 2008 and 2013.¹

The FTTP included five activities that sought to expand the production of selected tree fruit crops—olives, dates, almonds, and figs—and address constraints along these value chains. These activities were as follows: (1) an activity in rain-fed olive, almond, and fig areas, which provided training and technical assistance for farmers and other value chain actors, and expanded the area of olive production; (2) an activity in irrigated olive areas, which upgraded irrigation infrastructure, supported water user associations, and provided training and technical assistance to value chain actors; (3) an activity in irrigated date areas, broadly similar to that in irrigated olive areas but also providing additional assistance to improve the cultivation and processing of dates; (4) a cross-cutting activity that supported a variety of services in the fruit tree sector, including research, training for agriculture ministry staff, and marketing support; and (5) an activity, known as the Catalyst Fund, that partially funded the construction and provision of equipment to 20 modern olive oil processing units run by second-order producer organizations (cooperatives of cooperatives, known as *Groupements d'Intérêt Economique*, or GIEs).²

MCC contracted with Mathematica to conduct an evaluation of several components of the FTTP. Specifically, Mathematica is conducting two evaluations: (1) an evaluation of the investments in irrigated olive and date areas (activities 2 and 3), and (2) an evaluation of the modern olive oil processing units created by the Catalyst Fund (activity 5). This report presents the final findings for the evaluation of modern olive oil processing units; a separate report (Borkum et al. 2019) presents the findings for the other investments.

To evaluate the modern olive oil processing units created by the Catalyst Fund, we conducted a mixed-methods performance evaluation, which included a qualitative component, a descriptive quantitative component, and an olive oil testing component. The evaluation drew on qualitative data collected through focus groups with farmers and cooperative leaders in the catchment areas of the new units, as well as interviews with GIE presidents and other key stakeholders. These focus groups and interviews were largely conducted in 2019, several years after the end of the project.³ The evaluation also drew on two rounds of quantitative data from a survey of the GIEs that operate the new processing units, conducted in 2016-2017 and 2018, and results from tests of olive oil samples collected from the units in 2018.

In the chapters that follow, we provide context for the evaluation and present the final evaluation findings. In Chapter II, we describe the project's activities in more detail and discuss the program logic model and expected economic benefits. In Chapter III, we summarize what is known from the literature about the effects of similar interventions. In Chapter IV, we outline the

¹ In 2015, MCC and the Government of Morocco signed a second compact, which focuses on employability and land productivity. The Millennium Challenge Account-Morocco is implementing this compact between 2017 and 2022.

² Each GIE comprises several farmer cooperatives, typically focusing on the same value chain in a certain geographic area. They are intended to facilitate cooperation among the member cooperatives, especially in the commercialization and marketing of crops. The legal framework for GIEs in Morocco was established in 1997.

³ We also conducted a small number of stakeholder interviews in 2016 and 2018.

research questions our evaluation seeks to answer and describe the evaluation design, data sources, and analysis approach we used to answer them. In Chapter V, we present the main findings on processing unit operations, farmers' experiences, and prospects for sustainability based on qualitative data and GIE surveys; in Chapter VI we present the results of the tests of olive oil quality. We conclude in Chapter VII with a summary of the implications of our findings for the research questions and a discussion of lessons for future projects.

II. OVERVIEW OF THE PROJECT AND THE CATALYST FUND ACTIVITY

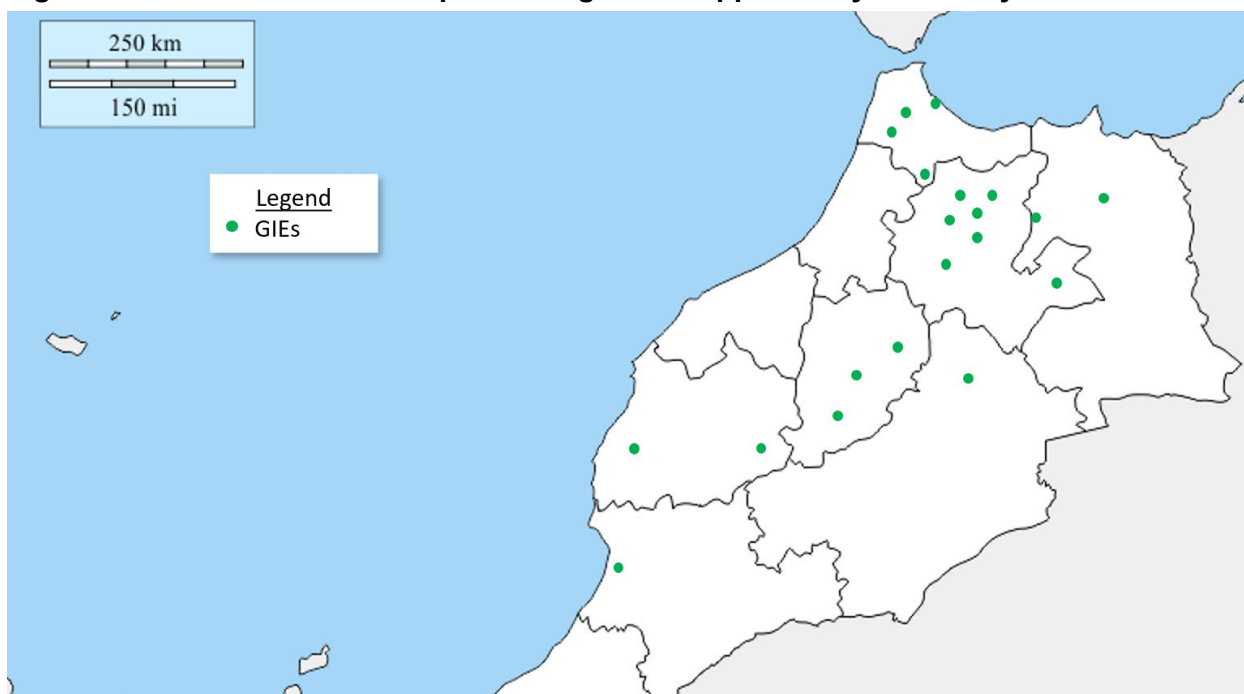
In this chapter, we provide context for the evaluation by describing the Catalyst Fund activity and presenting the mechanisms through which it would be expected to affect outcomes, as set out in the program logic. We also describe the ex-ante economic rate of return (ERR) that MCC calculated to compare the costs and expected benefits of the project.

A. FTTP activities

As discussed in Chapter I, the FTTP was part of a broader five-year compact signed in 2007 by MCC and the Government of Morocco to increase economic growth and reduce poverty in Morocco through investments in the FTTP and four other projects covering high-potential sectors. The Compact entered into force in September 2008 and closed in September 2013. The FTTP's primary objective was to stimulate growth in the agricultural sector by reducing the volatility of agricultural production, accelerating the transition from annual cereal crops to perennial tree fruit crops, and strengthening the integration of tree fruit crops into domestic and foreign markets (APP 2013).

To achieve this objective, the project implemented five activities; this evaluation report focuses on the Catalyst Fund activity (activity 5). The Catalyst Fund activity, which targeted 20 GIEs across rain-fed and irrigated olive areas, partly funded the construction of and provision of equipment to 20 new, modern, large-scale olive-crushing units for the production of olive oil. (Figure II.1 shows the location of the GIEs.) Specifically, the Fund provided grants to each GIE for 50 percent of the capital costs of processing unit infrastructure and equipment, with the rest of the funding contributed by the MAPM (30 percent) and the GIEs themselves (20 percent). The GIE portion comprised a contribution from member cooperatives (5 percent of the total) and a loan from *Crédit Agricole du Maroc* (CAM), Morocco's agricultural bank (15 percent of the total). The Catalyst Fund was introduced in mid-2011, relatively late in the Compact, and the new processing units were not yet operational when the Compact ended in September 2013. A few units operated on a limited scale in late 2013, and almost all were operational by late 2014. The Catalyst Fund activity also provided technical assistance to the GIEs related to technical operations, administration, and financial management.

The FTTP also implemented a broader set of activities in the olive areas that were in the catchment area of the new processing units. These activities included training for olive farmers, support for the creation and management of farmers' cooperatives and GIEs, training and technical assistance for existing olive oil processing units, and investments in irrigation infrastructure and, in irrigated olive areas, technical assistance for water user associations. Together, these activities aimed to enhance the yield and profitability of olive production in targeted rain-fed and irrigated olive areas. A separate final evaluation report discusses the FTTP's activities in irrigated olive and date areas (Borkum et al. 2019).

Figure II.1. Location of the GIE processing units supported by the Catalyst Fund

Note: Map shows regions of Morocco where GIE-operated processing units were established through the Catalyst Fund (internal boundaries demarcate the regions as they were defined during the Compact period).

B. Program logic

The FTTP program logic (Figure II.2 and Table II.1) is a combination of two separate logic models developed by MCC. It presents a series of (hypothesized) causal links among program inputs and outputs and short-, medium-, and long-term outcomes that potentially support the project's overarching goal of poverty reduction through economic growth. Each of the links in the program logic reflects MCC's assumptions about how the activities would affect Compact participants, which include producers, their families, and producer organizations. Assumptions in the program logic also provided the basis for MCC's ERR calculations for each activity.

For the Catalyst Fund activity, the program logic emphasizes the link between the Catalyst Fund activity and the activities in irrigated and rain-fed olive areas where the new processing units were located. Specifically, there is an interplay between increased demand for high-quality olives from the processing units (to enable them to produce high-quality oil), and farmers' increased ability to meet this demand as a result of the other activities (which included farmer training on technical management of olive crops, support for the management of olive cooperatives, and upgrading of irrigation infrastructure). The increased revenues from selling high-quality oil would then contribute to increasing farmers' incomes.

To assess the FTTP program logic at the start of the evaluation, we reviewed project documents, including the compact completion report, annual activity reports, and quarterly reports from implementers and other stakeholders. We also reviewed the available evidence on the impacts of similar programs in other contexts. We then examined the program logic for each component, noting potential concerns when applicable (Elabed et al. 2014). Overall, we determined that the FTTP program logic was based on a reasonable set of assumptions about potential links between the activities and possible outcomes. It therefore seemed reasonable that the project activities could potentially produce positive effects on the desired outcomes specified in the program logic. However, a wide range of risks or project design and implementation factors could undermine each assumption and potentially prevent the project from achieving its intended results. Factors such as market conditions and the extent to which farmers and their organizations adopt new practices were identified as determining the success of the project. In Chapters V and VI, we assess the extent to which the effects envisaged in the logic model occurred in practice, and the reasons why.

Figure II.2. The FTTP program logic

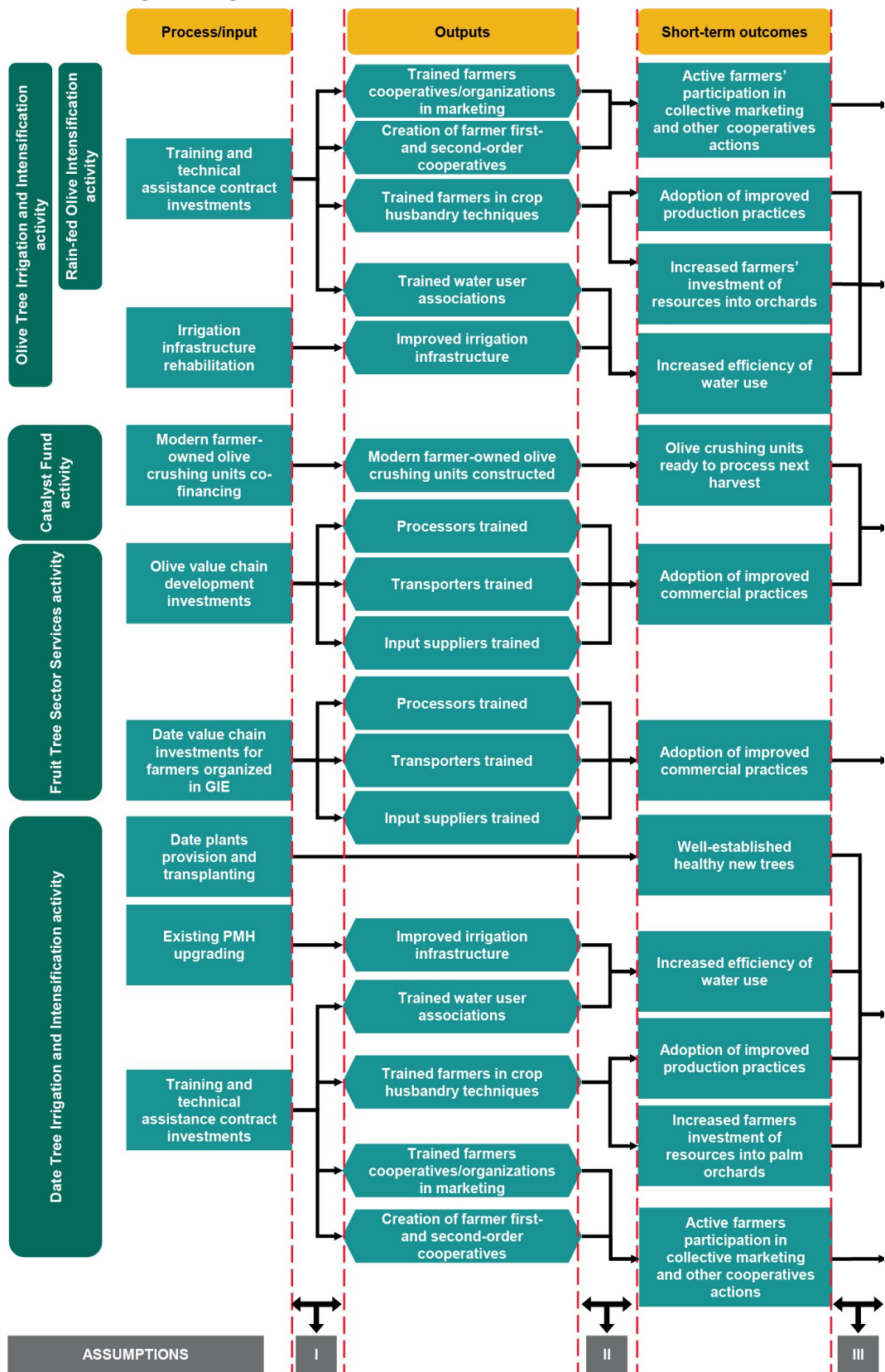


Figure II.2. The FTTP program logic (continued)

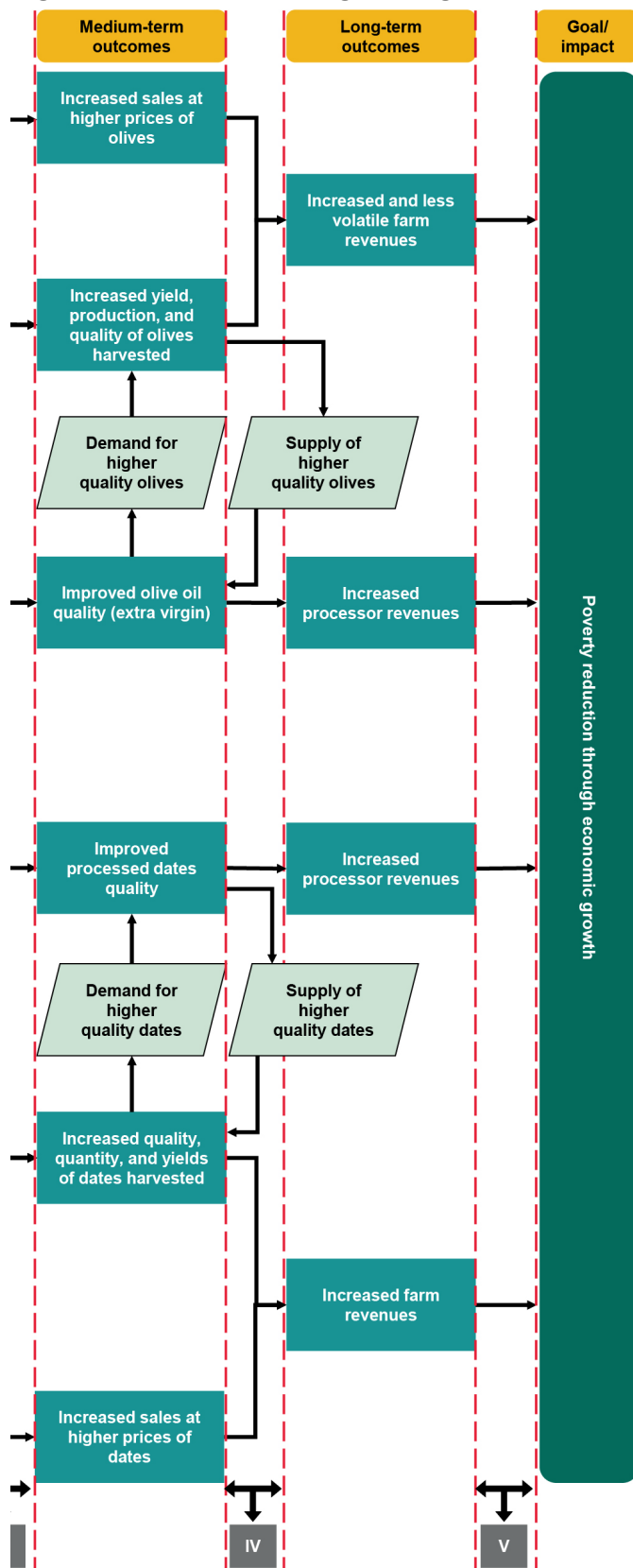


Table II.1. FTTP program logic assumptions

Assumptions
I.1. The budget allocated for this activity is sufficient.
I.2. Procurement of necessary goods and services is timely and successful.
I.3. Qualified consultants and works contractors are hired.
II.1. Farmers and their organizations have the incentive to participate (the value of the training is clearly communicated, both directly and through demonstration).
II.2. Farmers and their organizations follow through on their commitments and responsibilities.
II.3. Farmers are able to access the necessary financing to adopt improved practices.
II.4. Rehabilitation of the irrigation infrastructure will lead to increased efficiency of that infrastructure.
III.1. No major changes to the market for olives or dates will de-incentivize investments by farmers and/or processors.
III.2. Demonstration effects will increase incentives for adoption of best practices.
III.3. An increased efficiency of water use will lead to higher yield and revenue.
IV. Both upstream (production) and downstream (commercialization) improvements will happen simultaneously.
V. Olive and date producers and processors are able to respond to market conditions profitably.

Source: MCC

Note: Roman numerals correspond to the boxes at the bottom of the program logic in Figure II.1.

C. Economic rate of return

MCC calculates ERRs based on cost-benefit analysis models to assess whether its projects are sound investments. The ERR is a summary statistic that reflects the economic merits of an investment. Conceptually, it is the discount rate at which the benefits of an intervention are exactly equal to its costs; a higher ERR implies relatively higher benefits and lower costs. MCC modeled the ERR for several of the FTTP's activities and produced updated ERRs in 2014, soon after the end of the Compact, based on actual costs and expected benefits.

The benefits of the Catalyst Fund processing units, which were just one component of the FTTP in targeted olive areas, were folded in a non-separable way into the overall benefit stream in MCC's end-of-compact ERR models for the activities conducted in rain-fed and irrigated olive areas. Moreover, because an impact evaluation of the Catalyst Fund processing units was not feasible, there is no data with which to estimate a separate ex-post ERR for these units by comparing the estimated benefits (in terms of the estimated impacts on farmers' net household income) with the estimated costs. Instead, in Chapter V, we use the evaluation findings to reassess the plausibility of assumptions underlying the Catalyst Fund component in the ex-ante ERR models in olive areas.

III. LITERATURE REVIEW

As we described in Chapter II, the FTTP sought to stimulate growth in the Moroccan agricultural sector through a variety of interventions aimed at improving the production, processing, and sales of fruit tree crops. In this chapter we review the existing literature on the impacts of two main types of interventions that have commonalities with the Catalyst Fund-financed processing units in olive areas. These interventions are (1) investments in post-harvest infrastructure, and (2) support for farmers' organizations in commercialization and marketing.

A. Investments in postharvest infrastructure

Postharvest infrastructure can range from cold storage and processing units to improved roads for transportation of crops (Asian Productivity Organization [APO] and FAO 2005). In the context of the FTTP, the establishment of modern olive oil processing units through Catalyst Fund assistance aimed to add value by transforming olives into high-quality olive oil to be commercialized through the GIEs. Therefore, the most relevant strand of the literature on postharvest infrastructure focuses on infrastructure used for value-added processing (University of Kentucky 2011). By adding value to crop production, this type of postharvest processing can potentially increase farmers' returns and is considered one of the most viable ways of reducing poverty and improving rural livelihoods, particularly for farmers with small land holdings (Lundy et al. 2002).

One way in which processing crops can increase farmers' returns is by making them more competitive on the export market, which can be more profitable than selling products domestically (Cramer 1999). For example, Tanzanian farmers who switched from hand-processing coffee at home to using modern processing plants were able to access higher-paying markets by improving the quality of their coffee beans, thus increasing overall profits (TechnoServe 2013). A study in Mozambique found that farmers who started selling cashew nuts to a modern processing plant increased their annual incomes by about 20 percent, on average (Webber and Labaste 2010). In Colombia, the construction of new drying units for processing cassava into dried chips for animal feed provided a new market opportunity for cassava farmers when crop prices were low or when quality was not good enough for human consumption (Gottret and Raymond 1999); these new drying units were associated with a decrease in poverty among beneficiary farmers.

However, simply building postharvest infrastructure is not enough; some technologies are difficult for small-scale farmers to adopt because they require increased labor, whereas others are prohibitively expensive. An assessment of 12 international postharvest infrastructure projects (mostly aimed at reducing postharvest losses) found that large-scale infrastructure such as packing houses and cold storage facilities were most commonly reported to be unsuccessful because of factors such as an inconvenient location that was difficult for farmers to access, high energy costs to operate them, and the lack of trained personnel to manage them (Kitinoja 2013). In contrast, small-scale innovations that integrated postharvest management systems and involved gradual adoption were most likely to be adopted and result in long-lasting effects. Examples of successful small-scale innovations include introducing the use of protective

containers for crops during harvest and transport, storing harvested crops in the shade, and sorting and grading crops for enhanced market value.

Barriers to adoption of postharvest practices might also be more likely to be overcome when coupled with social and physical infrastructure improvements. For example, Minten et al. (2014) found that cold storage practices increased in Bihar, India when the government improved road infrastructure and public service provision (such as electricity and law enforcement, the latter of which improved security for rural businesses), and implemented policy reforms (deregulating cold storage facilities, which improved access to cold storage, and privatizing agricultural marketing infrastructure, which facilitated the emergence of cold storage facilities as new hubs of marketing activity).

Overall, the existing literature suggests that postharvest infrastructure improvements have the potential to be effective in improving farmers' well-being, although farmers face challenges in adopting these technologies.

B. Supporting farmers' organizations in commercialization and marketing

Small-scale farmers in developing countries often lack access to markets where they can buy their inputs and sell their outputs. In remote areas, farmers may have poor physical access to markets and face high transaction and transportation costs, which undermine their ability to participate in trade. They may also lack information on market prices, access to collective organizations that can empower them in their negotiations with larger market players, and improved risk management associated with market participation. To increase poor farmers' access to markets and enable them to respond profitably to market requirements, the FTTP supported the creation of first- and second-order farmers' organizations and provided technical assistance to these organizations, training them on production, processing, and storage techniques as well as marketing strategies. The Catalyst Fund processing units in olive areas and accompanying technical assistance were specifically intended to help the new second-order organizations access new markets that demand high-quality olive oil.

Given the importance of access to markets, international agencies have taken several steps to strengthen linkages between farmers and agribusiness (Wiggins et al. 2009). Promoting farmers' organizations as a tool for enhancing market access by reducing transaction costs and improving bargaining positions has also become increasingly popular (Wiggins and Keats 2013) and was highlighted in the 2008 World Development Report (World Bank 2008).

There is ample evidence that membership in farmer organizations can increase market participation and improve farmer welfare (Aku 2018; Bachke 2009; Mutonyi 2019; Gyau et al. 2014; Wiggins and Keats 2013; Kirui and Njiraini 2013). For example, Aku et al. (2018) used propensity score matching to show that small-scale farmers in Tanzania who were members of farmer organizations had significantly higher agricultural incomes than farmers who did not belong to an organization. Farmer members were also more likely to incur lower costs for transporting their produce to markets, despite being located further distances from the market.

However, the extent to which group membership is beneficial for farmers depends on various factors such as the type of farmer organization, intensity of participation, and crop. One study showed that benefits were larger for farmers of market vegetables, who had higher transaction costs associated with market access than farmers growing high-value crops (Hellin et al, 2009). New farmer organizations formed by actors external to the community (such as governments and NGOs) are more likely to fail, due to poor group dynamics, than traditional groups with developed social bonds (Gyau et al 2014). Collective action opportunities may not translate into income improvements if the organization's financial and time demands on farmers outweigh the benefits (Kaganzi et al, 2009).

C. Contribution of the evaluation

The performance evaluation of the Catalyst Fund processing units described in this report provides valuable evidence on the establishment and operations of a potentially important type of postharvest infrastructure in the Moroccan context. An important feature of the Catalyst Fund model was that the new processing units were managed by second-order producer organizations, the GIEs, which had to make a monetary co-contribution to establish the units. This evaluation might be especially valuable from a policy perspective if additional olive oil processing units (or other types of postharvest infrastructure) are established in the future following a similar management and/or funding model.

IV. EVALUATION DESIGN

In this chapter, we provide an overview of the design for the mixed-methods performance evaluation of the Catalyst Fund processing units. We begin by listing the key evaluation questions and describing the evaluation methodology. We then describe the data analyzed in this final report.

A. Research questions

The evaluation of the Catalyst Fund processing units sought to answer the following research questions:

Research questions

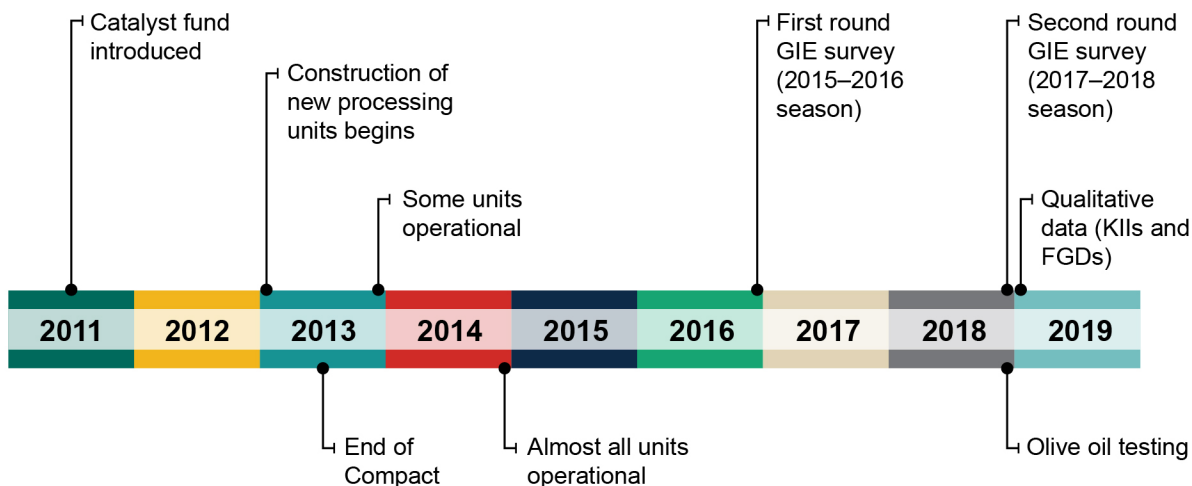
1. To what extent are the GIEs established by the Catalyst Fund operating as intended? To what extent are farmers in the GIEs' catchment areas participating in cooperatives that are members of the GIEs, and why?
2. How, and to what extent, does the level of success vary across GIEs? What factors facilitate or inhibit the successful operations of GIEs?
3. How did the Catalyst Fund processing units affect farmers' revenues from olives (total and per tree), total agricultural revenues, and household income? Did these effects vary by farmer characteristics such as sex, age, and pre-project revenues?
4. Which international quality benchmarks does the olive oil produced by the Catalyst Fund processing units meet?
5. Besides making modern processing units available, what role have the GIEs played in the development of olive oil processing and marketing? Have GIEs been able to identify new markets and obtain better prices for olive oil, and how have they done so?
6. Have the new GIEs managed to repay the credit used to help fund the establishment of the new processing units? To what extent have they been successful in accessing and repaying additional short- and long-term credit to operate effectively?
7. What types of government or other external support have the GIEs needed and received to sustain them? What additional support will they need (if any), and will they be able to obtain it?
8. Are the Catalyst Fund processing units likely to be sustainable in the long run?
9. To what extent has the GIE/processing unit model been replicated outside project areas and to what degree is that attributable to the Catalyst Fund?

B. Methodology

To answer these research questions, we conducted a mixed-methods performance evaluation to provide evidence on the successes of the Catalyst Fund units and the challenges that they face, identify factors associated with success, and assess the sustainability of the activity and potential for replication. The evaluation had three main components: (1) a qualitative component, which drew on focus groups and interviews with key stakeholders; (2) a quantitative component, which drew on surveys with the GIEs that operate the units; and (3) an olive oil testing component, which tested olive oil samples from the units to assess the quality of the oil they produce. Below

we describe our methodology in more detail. (Figure IV.1 summarizes the timing of implementation and the data collection activities.)

Figure IV.1. Data collection timeline



KII = key informant interview; FGD = focus group discussion

The **qualitative component** of the evaluation drew on focus groups and interviews with key stakeholders. Most of these interviews and focus groups were conducted in early 2019; in almost all cases, this was five or six crushing seasons after the units had started to operate. (The crushing season typically starts in October or November and ends in December or January; it typically lasts between one and three months in this timeframe.)

We conducted separate focus groups with olive farmers who were members of cooperatives that were member of the GIEs, and with olive farmers in the same areas who were not members of these cooperatives. These discussions provided insights on farmers' involvement with cooperatives and GIEs (or reasons for not being involved), their perceptions of the new units, and how involvement with the new units has affected farmers' revenues and income. We also conducted focus group discussions with leaders of cooperatives that were members of the GIEs to obtain additional perspectives on farmers' experiences and involvement with cooperatives and GIEs, as well as the extent to which the GIEs were operating as intended.

We conducted interviews with the following stakeholders: GIE leadership; the leadership of the national association of olive GIEs (the *Association Nationale des GIE d'Olives*, or ANGIEO), which was established to represent the interests of GIEs; the headquarters and field staff at the United Nations Office for Project Services (UNOPS), which provided technical assistance to the GIEs during the Compact and post-Compact until 2016; the leadership at *Unité de Soutien aux GIE et d'Appui à la Valorisation* (USGAV), the unit within MAPM tasked with supporting the GIEs; and former APP staff. These stakeholders provided different perspectives on the operations of the GIEs and processing units, their main successes and challenges, and expectations for their future evolution and sustainability.

The **quantitative component** of the evaluation drew on two rounds of survey data collected from all 20 GIEs that received assistance from the Catalyst Fund. The survey was conducted in late 2016 and early 2017 and again in late 2018. The second round of the survey covered the 2017–2018 crushing season; in almost all GIEs, this was the fourth or fifth crushing season since the unit was constructed. The survey data enabled us to complement the findings from qualitative data with descriptive statistics that provided insights regarding the operations of the processing units and the marketing and sales of olive oil by the GIEs.

For the final component of the evaluation, **olive oil testing**, we collected and tested olive oil samples from all 20 GIEs in late 2018 (at the start of the 2018–2019 crushing season) to assess the quality of the oil relative to international benchmarks. Evaluating olive oil quality is important because there are trade categories that correspond to the quality of oil produced; those categories have different market values. The modern processing units established by the project were expected to produce high-quality olive oil with a high market value.

To develop the evaluation findings, we systematically triangulated the findings from the qualitative data sources to identify key themes in the responses that were relevant to the research questions, highlighting mechanisms, context, and similarities and differences in perspectives. We also triangulated these findings with the descriptive statistics from the GIE survey and the results of the olive oil tests to provide a thorough understanding of the operations and effects of the Catalyst Fund processing units.

C. Data sources

As described above, the performance evaluation of the Catalyst Fund processing units relies on qualitative data from a variety of stakeholders, as well as quantitative data and testing of olive oil from all 20 GIEs. Below, we describe these data sources in more detail.

1. Qualitative data

Mathematica contracted with C&O Marketing, a Moroccan data collection firm, to conduct focus groups with farmers and cooperative leaders and interviews with GIE and ANGIEO leadership in February and March 2019. Mathematica developed detailed protocols and participated in training interviewers and piloting the protocols. C&O Marketing recorded all focus groups and interviews it conducted, and prepared transcripts in French and English. Mathematica staff conducted a handful of interviews with high-level stakeholders in October 2016 and May 2018. Mathematica recorded these interviews and prepared detailed notes for use in the analysis. Table IV.1 summarizes the types of respondents for the qualitative study, the number of interviews or focus groups, and the criteria used to select them.

Table IV.1. Interviews and focus groups

Respondent	Data collection method	Number	Selection approach
GIE leaders	Interviews	8	Leaders of 8 of the 20 GIEs, selected to provide performance and geographic diversity
Farmers who were members of cooperatives that are members of a GIE	Focus groups	4 ^a	Farmers who were members of cooperatives in 4 of the 8 GIEs selected for interviews with leaders; selected for diversity in whether they sold olives to the GIE and diversity in socioeconomic characteristics
Farmers who were not members of cooperatives that are members of a GIE	Focus groups	4 ^a	Non-member farmers in the catchment area of the 4 GIEs selected for focus groups with farmer members; selected for diversity in socioeconomic characteristics
Leaders of farmer cooperatives that were members of a GIE	Focus groups	4 ^a	Leaders of cooperatives in each of the 4 GIEs selected for focus groups with farmer members; in most GIEs all cooperatives were included
ANGIEO	Interviews	1	National level
UNOPS national office*	Interviews	1	National level
UNOPS field agents*	Interviews	2	Field agents working in 2 of the 20 GIEs; selected based on convenience (different from the GIEs selected for GIE leader interviews and farmer focus groups)
USGAV*	Interviews	1	National level
Former APP staff*	Interviews	1	National level

(*) = Interviews conducted by Mathematica in 2016 (UNOPS national staff and field agents) and 2018 (USGAV and former APP staff); the remaining interviews and all focus group were conducted by C&O Marketing in 2019.

^aEach focus group had between 8 and 10 participants.

We purposefully selected 8 of the 20 olive GIEs for interviews with GIE leaders (Figure IV.1), using data from the first round of the quantitative GIE survey to obtain diversity in criteria such as the amount of olives purchased for crushing, volume of oil produced, percent of farmer members from which the GIE bought olives, reliance on crushing services,⁴ and overall revenues in the 2015–2016 crushing season. From these eight, we selected four for the focus groups, attempting to select a group with diversity in geography and the percent of farmer members from which the GIE bought olives.

⁴ As we describe in Chapter V, many GIEs provide crushing services (also known as tolling services) to farmers as an additional revenue stream. They involve farmers paying a fee to crush their olives and taking away the resulting oil for personal use or sale. In contrast, the main envisaged revenue stream for the GIEs is for them to purchase olives from farmers and produce and sell their own oil.

In the four GIEs that were selected for both interviews and focus groups, C&O Marketing worked with cooperative leaders and water user association leaders (in irrigated olive areas) to identify potential focus group participants. Specifically, C&O Marketing obtained the names of potential participants and their characteristics including farmer age, farm size, volume of olives the farmer sold to the GIE, and whether the farmer used the Catalyst Fund processing unit for crushing services. From this list, C&O selected participants (between 8 and 10 per focus group) to ensure diversity across these characteristics. For cooperative leader focus groups, C&O Marketing invited the leaders of all cooperatives in each selected GIEs (there were no more than 10 per GIE).

The interview and focus group protocols were tailored to each group of respondents but covered similar themes to allow for triangulation of findings across respondent types. These key themes included the following:

- Main successes and challenges in the operations of the Catalyst Fund processing units, and how challenges have been or are being addressed
- Extent to which Catalyst Fund processing units are operating following the intended model and reasons for any changes
- Ability of GIEs to access and repay credit and maintain adequate cash flows
- Expectations for the evolution of the GIEs and Catalyst Fund processing units—for example, in terms of membership, scale of operations, and targeted markets
- The extent to which the Catalyst Fund processing units are accessible to farmers (through cooperative membership or other mechanisms), and main barriers to their use
- How and why access to the Catalyst Fund processing units has affected farmers
- The role of GIEs in marketing olive oil and main opportunities and challenges related to marketing
- GIEs' capacity to manage and maintain the Catalyst Fund processing units, and the extent to which these units are likely to be sustainable

2. Quantitative survey of GIEs

As described earlier, the performance evaluation of the Catalyst Fund processing units also draws on two rounds of a largely quantitative survey of GIEs. The survey targeted all 20 GIEs that received Catalyst Fund assistance and was administered to the GIE president or another member of the GIE leadership.⁵ The survey captured information about cooperative and farmer membership; the

⁵ About two-thirds of the first-round GIE surveys and about one-third of the second-round surveys were conducted with more than one respondent. Besides the president (the most common type of respondent), other common types of respondents were the general secretary, treasurer, or manager.

production and sales of olive oil; revenues from olive oil and other products or services; loans and costs; and distribution of profits to farmers (Table IV.2).⁶

Table IV.2. GIE survey, topics covered

Domain	Key topics covered
Respondent information	Number and roles of respondents
GIE and olive oil processing unit information	Season of first operation, number of member cooperatives, number of farmer members, share of female members, cooperatives expected to join
Olive oil production in previous crushing season	Amount of olives purchased for crushing from farmer members and non-members, price paid for olives, period and duration of crushing season
Production, commercialization, and marketing of olive oil in most recent agricultural season	Amount of olive oil produced by quality grade, olive oil sold, olive oil exported, average price by quality grade, types of buyers, marketing activities
Revenues in the most recent agricultural season	Revenue from olive oil and other products, revenue from crushing services
Loans, costs, and profits in the most recent crushing season	Size and repayment of loans to establish the units, size and repayment of loans for working capital, operating costs, distribution of profits to cooperative farmer members
Challenges and changes	Challenges experienced, changes experienced or expected (open response questions)

The timing of the GIE survey was aligned with the timing of the crushing season. Specifically, we conducted each round several months after the end of the relevant crushing season to provide time for the GIEs to sell olive oil from the previous crushing season and make decisions on profit distribution (if any), and so that we could collect olive oil samples from the new season's production at the same time. The first round of the GIE survey in November 2016 and January 2017 covered the 2015–2016 crushing season,⁷ and the second round in October and November of 2018 covered the 2017–2018 crushing season. Of the 20 GIEs, C&O surveyed 19 in 2016–2017 and 18 in 2018. The remaining GIEs could not be interviewed because of internal conflicts, which had resulted in these GIEs becoming dysfunctional.

3. Testing of olive oil samples from GIEs

C&O Marketing also collected olive oil samples from 16 of the 20 processing units in October and November 2018, at the same time the 2018 GIE survey was conducted. (The four GIEs from which olive oil samples was not collected included one of the GIEs that was dysfunctional due to internal conflicts, two that were rented out to private companies and were not producing any oil of their own, and one that did not have any oil in stock on the survey date.)⁸ This timing, shortly after the start of the 2018–2019 crushing season, ensured that high quality oil was still available at the GIEs prior to

⁶ As we discuss in Chapter V, it was expected that the GIEs would return profits from olive oil sales to farmers, in addition to paying them for their olives.

⁷ The first-round survey was delayed until January in three GIEs because they had not yet conducted their annual general assemblies and/or the president was traveling.

⁸ C&O Marketing did collect a sample of olive oil from a second dysfunctional GIE that refused to be interviewed for the GIE survey but had produced some oil.

being sold. Because GIEs might produce oil of several different quality grades, we requested that GIEs identify the single tank containing the highest quality oil produced, from which C&O Marketing drew the sample;⁹ this provides an upper bound on quality. Specifically, C&O Marketing filled three bottles of either 500 or 750ml with oil from the selected tank, using dark glass bottles. The samples were anonymized and sent for analysis to the national laboratory in Casablanca, *La Laboratoire Officiel d'Analyses et de Recherches Chimiques*, in late January 2019, where they were analyzed in late February and early March 2019.

⁹ It is best practice to mix the oil in the tank before extracting the sample, but this was not possible because the GIEs' tanks are not equipped with mixers.

V. FINDINGS ON PROCESSING UNIT OPERATIONS, FARMERS' EXPERIENCES, AND SUSTAINABILITY

In this chapter we present findings on the operations of the Catalyst Fund-supported olive oil processing units, the benefits for farmers, and the prospects for sustainability several years after the units started to operate. We begin by describing and assessing the state of infrastructure, equipment, and management at the processing units, as well as cooperatives' membership in GIEs and farmers' membership in cooperatives. Next, we explore olive purchases by the GIE, and production and sales of the olive oil that they produce. We also assess how and to what extent farmers have benefitted from the processing units and the conditions required for the units to be sustainable. Finally, we revisit the end-of-Compact ERR estimates and use the evaluation findings to assess whether the underlying assumptions likely held in practice.

A. Infrastructure, equipment, and management

The GIE olive oil processing units were all constructed to have similar infrastructure, as well as equipment that met modern standards for olive crushing and olive oil storage. Specifically, the processing units comprised an olive crushing area equipped with machines for washing and crushing olives, as well as separating the oil from the pulp; a storage room for olive oil (with 10 large stainless steel storage tanks); outdoor basins for the by-product left after crushing (one for the pomace [pulp] and another for liquid runoff); a truck weighing station; a laboratory (mainly for testing the acidity of the oil, a key criterion for quality); offices and meeting rooms; and (in some cases) a showroom. (Figure V.1 shows some of the infrastructure at the processing units.) Below, we assess the state of the infrastructure and equipment at the processing units, as well as how the GIEs manage them.

As of early 2019, the infrastructure and equipment at the GIE processing units was mostly in good condition and many GIEs have acquired additional infrastructure and equipment.

All but one of the eight GIE presidents interviewed reported that the infrastructure provided through the project was in good condition. The remaining GIE noted some design flaws including the proximity of the storage room to sanitation pipes (which could lead to contamination), a damaged outdoor basin, and contaminated water from a poorly-constructed well that the project funded.

All GIE presidents who were interviewed reported that the olive crushing equipment was still in good condition, and that they have been conducting regular maintenance of this equipment as needed. They were generally satisfied with the equipment provided, although several noted that the bottling equipment—which requires bottles to be filled and labelled manually—would not be enough if their unit were to operate at a higher capacity and sell more oil in bottles rather than in bulk. (At the time of data collection, many GIEs had not yet experienced high demand for bottled oil but hoped to sell more bottled oil in the future, as selling in bottles is typically more profitable than selling in plastic containers or in bulk.)

Figure V.1. GIE processing unit infrastructure

Source: Mathematica.

Note: Photographs show (1) machine for crushing olives (top left), (2) storage tanks for olive oil (top right), (3) area for loading olives into the crushing machine (bottom left), and (4) an outdoor basin for olive crushing by-products (bottom right).

Most GIEs have made small additions to the original infrastructure, such as sheds for crates or trucks, new storage basins (or rehabilitating existing basins), wells to provide on-site water for washing olives, and walls for protection against floods. Some GIEs have also acquired new equipment to improve their olive oil production, such as smaller tanks (to prevent oxidation of the oil that can occur when large tanks are only partially filled), olive harvesting equipment, and trucks for transporting olives to the GIE. These improvements have typically been funded by MAPM, other donors, or in a few cases by the GIE itself. A few GIEs have also added equipment to diversify their operations. For example, one GIE obtained donor assistance to expand their activities to producing both table olives and logs/bricks for fuel (from a by-product of olive oil production), as well as processing cereals and legumes by filtering and drying them.

Most GIEs have a board that works on a voluntary basis, and lack permanent staff with sufficient skills and experience in administration, financial management, and marketing.

At the GIEs' annual general assemblies, representatives of member cooperatives select the management board, which typically includes a president, treasurer, and secretary. All these board members work on a voluntary basis and often lack the necessary skills and experience to perform well in their roles. The boards at some GIEs have changed frequently, leading to instability and a lack of continuity. A few GIEs have been able to hire a full-time manager or director as well as technical staff; however, most GIEs have been unable to hire permanent paid staff because of the seasonal nature of the work and lack of funds to pay a full-time position.

Several national-level stakeholders suggested that differences in performance across GIEs can be attributed in large part to differences in the quality of the GIE leadership—especially the GIE president. In general, these stakeholders perceive that GIEs with younger, more educated, and more dynamic leaders have been more successful in gaining the trust of cooperatives and farmers and successfully engaging them in the GIE. Because the Catalyst Fund was only introduced towards the end of the Compact, GIE leaders had to be identified quickly by member cooperatives, which in some cases might have resulted in unmotivated or uncharismatic leaders (such as farmers who were selected out of respect for their seniority and not for their leadership abilities).

Most GIEs view the activities of ANGIEO as limited and ineffective.

The national association of olive GIEs, ANGIEO, was created in 2012 at the same time that the GIEs were established. It was envisaged that ANGIEO would represent the GIEs' interests with stakeholders (such as MAPM and CAM). The association is also a member of the national federation of olive producers. It has a staff of three—president, treasurer, and a secretary—and is heavily reliant on the president to guide its activities.

Of the 20 GIEs established by the FTTP, 12 were fee-paying members of ANGIEO at the end of 2018, of which 8 were active members. (In addition to these 12 members, another 4 GIEs used to be members but have been excluded for non-payment of fees.) The association holds regular meetings, including an annual general assembly for all members, plus ad-hoc meetings with a subset of the GIEs as the need arises (for example, to address a specific problem or to avail the GIEs of new opportunities). There is also a WhatsApp group for association members to communicate with one another and the association, and to discuss and solve their problems. The

association plays a role in marketing, disseminating information to the GIEs about the state of the market and marketing opportunities (much of this information is obtained by participating in the meetings of the national federation of olive producers, and is disseminated through WhatsApp).

However, most GIE presidents we interviewed did not view the association as being active and/or effective. Many GIE presidents emphasized that they would like the association to play a more active role in identifying new marketing opportunities and connecting GIEs to potential buyers.

B. Farmer and cooperative membership

Each GIE has several cooperative members, and each cooperative has many farmer members. In this section we describe both cooperative and farmer members in the 2017–2018 crushing season.

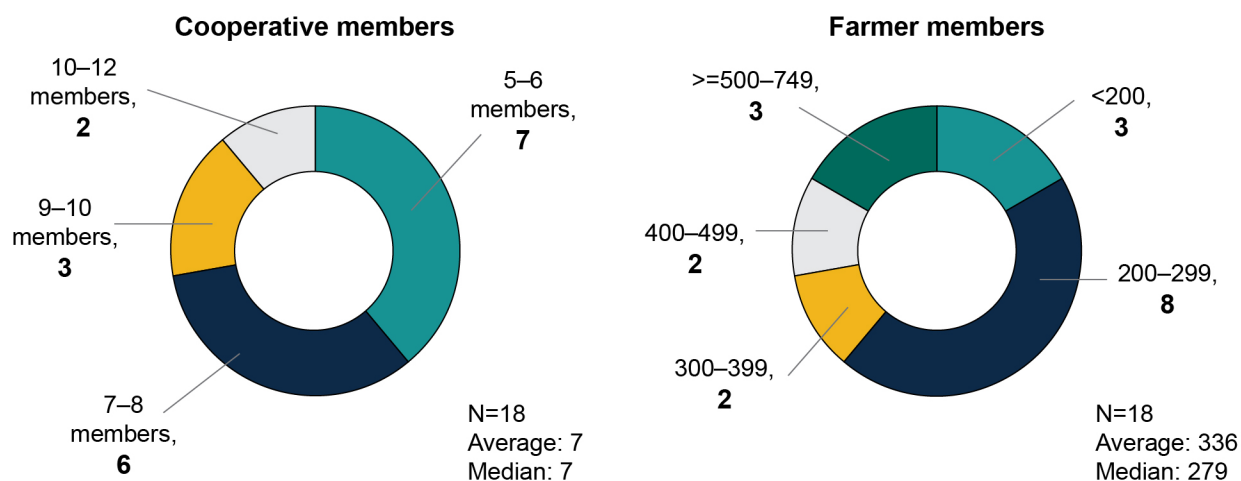
The number of cooperative and farmer members in each GIE has been relatively stable over the past few years; only about 1 in 10 farmer members was female.

Most GIEs had fewer than 10 cooperative members in the 2017–2018 crushing season, with an average of 7 cooperatives (Figure V.2). Cooperative membership is fairly stable—between the 2015–2016 and 2017–2018 seasons, the number of cooperatives was the same in 14 of the 17 GIEs interviewed in both seasons (it increased in 1 GIE and decreased in 2 GIEs; not shown). Only two GIEs mentioned plans to add an additional cooperative in the 2018–2019 season.

In the 2017–2018 season, the number of farmer members each GIE had in its cooperatives varied from less than 200 to about 750 members, with an average of 336 (Figure V.2). The number of farmer members increased in about half of the GIEs and decreased in the other half relative to 2015–2016, but the average number of members was similar (not shown). To place these membership numbers into context, stakeholders almost unanimously noted that only a small share of olive farmers in the catchment area of the GIEs were farmer members of GIE cooperatives. (We do not have the data necessary to quantify this share.)

High membership fees may be a barrier for new farmer members joining GIE cooperatives or new cooperatives joining the GIE. According to several cooperative leaders, farmer membership fees, which vary considerably across cooperatives, have increased substantially to help early farmer members recover part of their up-front investment. (As mentioned in Chapter I, member cooperatives contributed 5 percent of the costs of establishing the processing units.) For the same reason, existing cooperative members in some GIEs have imposed high fees for new cooperatives to join. Some national-level stakeholders suggested that these high fees for new cooperative members were intended to deter additional cooperatives from joining the GIE, so that only the existing members would benefit.

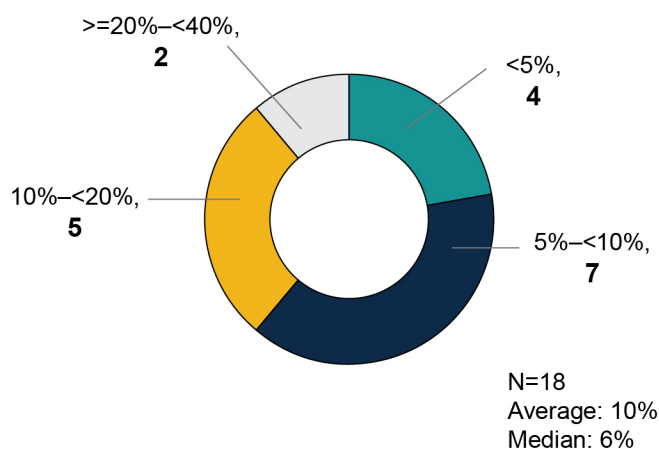
Figure V.2. Number of cooperative and farmer members per GIE, 2017–2018 season



Source: 2018 GIE survey.

According to cooperative leaders, most farmer members were male farmers who operated small or medium-sized farms. Most cooperatives had few female members because of conservative social norms that prevent women from participating. (Some GIEs had female cooperative members, which facilitated women’s participation in those GIEs.) Overall, it was rare for more than 20 percent of farmer members across a GIE’s cooperatives to be female, and the average across GIEs was 10 percent (Figure V.3).

Figure V.3. Percentage of farmer members of the GIE’s cooperatives who are female, 2017–2018 season



Source: 2018 GIE survey.

For women, it is very hard to join cooperatives; there are women whose husbands forbid this commitment. Very few women are educated and allowed to make this choice.

–Cooperative leader

C. Olive purchases

The envisaged operational model for the GIEs was that they would purchase olives from member cooperatives, which would pool olives together from their farmer members. The GIE would pay the cooperatives for these olives up front, and the cooperatives would distribute these payments to farmers based on their contributions of olives. The GIEs would then make an additional payment to the cooperatives after the GIE-produced oil was sold (a dividend), with the size of the dividend depending on the profits realized. In this section we explore the purchases of olives by GIEs, including the mechanism for these purchases and the extent to which they have taken place.

Most GIEs have strict requirements for quality of olives and offer a price slightly higher than the market price for high-quality olives, as well as complementary services to incentivize farmers to sell their olives to the GIE.

Most GIEs have strict criteria for the quality of olives because GIEs are trying to produce high-quality olive oil. Moreover, the crushing machines can be damaged by crushing poor quality olives. GIEs typically inspect the quality of the olives at the time of sale or by having their staff or cooperatives visit farmers, and track farmers who produce high-quality olives so they can purchase olives from them in the future. One GIE president, however, mentioned that the GIE had stopped imposing quality restrictions because its customers are not willing to pay for higher quality oil.

Although olive prices are largely determined by the broader market, GIEs typically offer a slightly higher price, particularly for high-quality olives, to incentivize farmers to sell to them. Some GIEs also offer a higher price for olives that yield more oil. Farmers who know they have olives that are of high quality and have followed the recommended practices for harvesting, storage and transportation can benefit from the higher price for their olives which the regular market does not offer (because it offers the same price regardless of quality). On the other hand, some farmers are deterred by the high quality standards because they know their olives will be inspected at the time of sale, and they will get a better price by selling to the market if their olives are of low quality.

To improve olive quality, most GIEs offer crates and transport for olives, training or technical advice, and equipment for pruning and harvesting either directly or through the cooperatives. (A few GIEs do not offer transportation and this disincentivizes some farmers—particularly those who do not live close to the GIE—from selling to it.) Further, many farmers who participated in focus groups suggested that GIEs were more likely to deal fairly with them than some intermediaries and other buyers—for example, by using properly-calibrated scales.

However, farmers are reluctant to sell olives to the GIEs because the GIEs, lacking working capital, are unable to pay them when olives are delivered.

Most GIEs do not have access to enough working capital (or experience delays in obtaining working capital) to purchase olives from farmers. Most farmers who participated in focus groups indicated that they required full payment for their olives up front because selling olives was their main source of income and they needed the money urgently. Because the GIEs have limited resources to make up front payments, these farmers prefer to sell at the market or to intermediaries, even at lower prices. Given that many GIEs have been unsuccessful in selling their olive oil at an attractive price and have large quantities of unsold inventory from the previous season (as we discuss later), few farmers are willing to take the risk of waiting for sales that might not materialize or be profitable. (Some GIEs themselves are hesitant to purchase olives because of unsold inventory from previous seasons.) In one case, a small group of wealthier farmers agreed to provide the GIE with olives and be paid only after the olive oil was sold because they were confident it would be sold, and in another the GIE received advances from olive oil companies that wanted to purchase their oil. However, these types of situations were uncommon.

Short-term *Avance sur Marchandises* (ASM) loans from CAM were expected to serve as the source of working capital for GIEs; the GIEs would use these loans to purchase olives and repay them when the olive oil was sold. However, GIE presidents reported that the ASM funds are often received late in the season, towards the end of the calendar year, whereas they require these funds in August or September to secure the supply of olives for the upcoming crushing season. (By the end of the calendar year, many farmers have already sold their olives; the quality of unharvested olives decreases and the price increases due to lower availability.) According to the 2017–2018 GIE survey data, 11 of the 16 GIEs that purchased olives in the 2017–2018 season received ASM loans, and the earliest they received them was in November 2017 (7 GIEs). The

Yes, of course I sell part of my production to the GIE! First, because the GIE pays at least 20 centimes more per kilogram compared to the going market price. Market sales also include additional charges such as transportation fees and the rural municipality tax. In contrast, GIE sales do not include any additional charges.

–Member farmer

It is important to note that the GIE is the only processing unit in this area that sets the price of olives according to their quality, and the price for high-quality olives is much better than the market price. This encouraged farmers who produce high-quality olives to sell more olive to the GIE.

–Member farmer

delays in receiving ASM loans are in part because there is a collateral requirement, which the GIEs usually meet using their stock of olive oil. Therefore, the GIEs need to have already produced enough olive oil that season before they receive the loan.

Some GIEs prefer not to rely on ASM loans because they are already heavily in debt with CAM (for the initial investment in the GIE and, in some cases, for previous years' ASM loans), and view it as risky to take on additional debt. Further, interest rates and bank charges for ASM loans are high, and the distribution of the loans in tranches is inconvenient, which makes these loans unattractive to the GIEs. Some GIEs who have taken ASM loans have had trouble repaying them on time (for example, because of a delay in selling their olive oil), which has led to penalty charges and made it difficult to obtain these loans in future seasons (lower amounts available at higher interest rates). Of the 11 GIEs that took ASM loans for the 2017–2018 season, 5 reported that they were behind on loan repayments.

Overall, GIE presidents largely view ASM loans as insufficient to account for their working capital needs. They view the limited provision of working capital as a major flaw in the post-Compact project implementation that, together with the large debt that they took on to establish the units (which we discuss in further detail later), did not set them up for success. As an alternative to ASM loans, some GIEs have sought other sources of working capital, especially by providing crushing services. (Crushing services, which are also referred to as tolling services, involve farmers bringing their own olives to crush at the GIE for a fee and taking away the resulting oil for personal use or sale.)

Moreover, even when GIEs secure working capital through ASM loans, farmers report that the process for the GIE to use these funds to pay farmers for their olives is time-consuming and complex. Specifically, farmers are given a voucher which they must take in person to a CAM branch to have funds transferred into their account. Some farmers do not have a CAM bank account or are located far from the nearest bank branch. Furthermore, in some cases, payments have taken up to six months to be credited to their accounts. Recognizing that this payment mechanism is a barrier to farmers selling their olives to the GIE, a few GIEs who have the resources to do so have changed their approach, paying farmers in cash up-front. Farmers involved with these GIEs reported that the improved payment system had encouraged them to sell olives to the GIE.

The working capital that we currently have is the ASM and it is not actually working capital because we are forced to have either merchandise in stock or money in the account. Working capital allows freedom in the management of these funds which we do not have. CAM constantly checks our product stocks and our account balances because that is their guarantee for their loan.

–GIE president

The reason why we do not have working capital is because the 5 percent that the cooperatives contributed at the beginning was only enough to help purchase the equipment and the materials for this GIE. This is the source of the problem—the GIE started operations with zero dirhams on hand, so how can it succeed?

–GIE president

We have no problem bringing our olives to the GIE processing unit if they pay us, but we cannot wait to be paid until after the oil has been sold because it is our only source of income.

–Non-member farmer

I sell my olives on the tree in August and I get paid in advance and I do not have to wait until the GIE sells the oil. We know in advance that there is no market for the final product, and one must wait a while until the GIE is able to sell the oil, which can take months.

–Farmer member

There is substantial variation across GIEs in the amount of olives purchased for crushing, but most are operating well below their capacity.

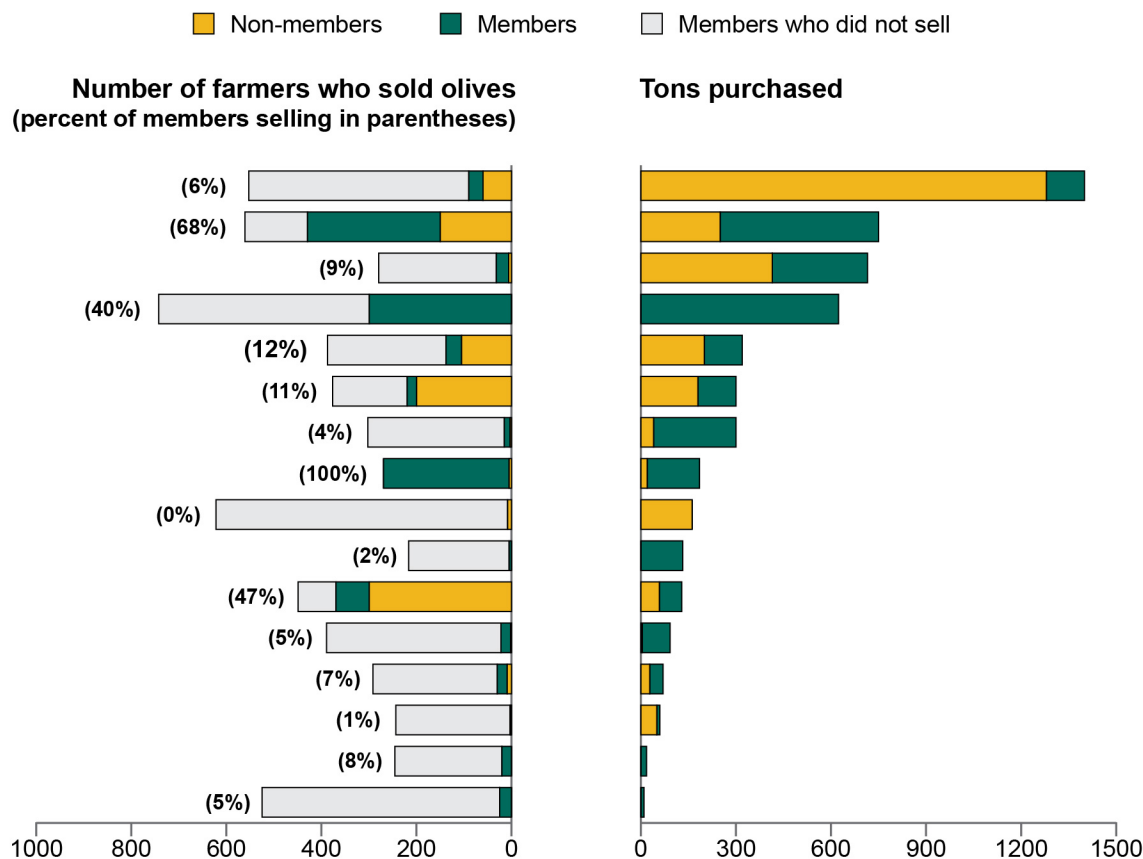
Overall, the 16 GIEs that were included in the GIE survey and purchased olives in 2017–2018 purchased an average of 329 tons of olives (a median of 174 tons). There was substantial variation across GIEs, with the amount purchased ranging from 10 tons to 1,400 tons (Figure V.4).^{10,11}

The total amount purchased is well below the crushing capacity of the GIEs. Their theoretical capacity is 60 or 80 tons of olives crushed per day, if they operate 24 hours per day during the crushing season. In interviews, several GIE presidents indicated that this assumption might be impractical, and that their true capacity is typically closer to 40 tons per day. Given the average crushing season duration of about 70 days, this suggests that GIEs could realistically crush an average of about 2,100 tons of olives per season—more than 6 times the average amount of olives they purchased in the 2017–2018 season.

¹⁰ We do not show the names of specific GIEs in Figure V.4 or similar figures to maintain respondent confidentiality.

¹¹ Restricting to the 14 GIEs that reported the amount of olives purchased in the 2015–2016 and 2017–2018 seasons, the amount purchased increased in 6 GIEs and decreased in 8 GIEs over this period. The total amount purchased across these GIEs increased by about 20 percent.

Figure V.4. Number of farmers who sold olives to the GIE and tons sold, 2017–2018 season



Source: 2018 GIE survey.

Note: Each bar represents one GIE. The percentage of members who sold olives to the GIE is shown in parentheses.

Most GIEs purchase olives from farmer members and non-members because olive purchases from members alone are not sufficient to meet the GIEs' needs.

Most farmer members were not actively engaging with the GIE by selling olives to it. According to the 2017–2018 GIE survey data, in most GIEs less than 10 percent of farmer members sold olives to the GIE (the average was 20 percent) (Figure V.4). A key reason for this, as discussed above, is that GIEs have challenges with working capital that prevent them from paying farmers up-front for their olives, so many farmers (especially small farmers) prefer to sell their olives to other buyers or crush them for self-consumption.

As a result, many GIEs buy olives from a relatively small number of farmer members with a large production volume, as well as non-member farmers. (GIEs would prefer to buy olives from member farmers only, to respect the GIE's operational model and out of loyalty, but simply cannot obtain enough olives from members.) GIE purchases of olives from non-members, especially those with a large production, often occur through direct communication between

GIEs and non-member farmers. Typically, GIEs contact specific non-members who they identify as having high-quality olives by sending staff to inspect olives, or from records of previous purchases. Some GIE presidents and cooperative leaders suggested that it will be important to increase cooperative membership among large farmers who can sell a significant quantity of olives to the GIE and afford to wait for payment. Some cooperatives have already started to do this.

Overall, of the 16 GIEs that were included in the GIE survey and purchased olives in 2017–2018, 11 purchased olives from both member and non-member farmers (Figure V.4). (Four purchased from member farmers only, and one from non-member farmers only.) Summing olive purchases across all the GIEs, only about one-half of all GIEs' purchases (in tons) were from member farmers.

Although the initial vision was for cooperatives to aggregate olives from member farmers and sell to the GIE, olives sales are typically made directly between farmers and GIEs.

Most farmers sell their olives directly to GIEs, although there are cases where the GIE purchases olives from cooperatives. An important reason for this, as we discussed earlier, is that the ASM loans that many GIEs rely on to purchase olives have a payment mechanism that requires payment vouchers to be issued to individual farmers rather than cooperatives. Nevertheless, all transactions from farmer members are recorded against their cooperatives. Specifically, GIEs typically record the farmer's name, cooperative, the quantity and yield of their olives, and region where olives are grown. This allows GIEs to keep track of farmers with high-quality olives.

Although most purchases occur directly between farmers and GIEs, GIEs use cooperatives to communicate when they want to purchase olives, the prices they offer, and the payment procedure. Some also engage cooperatives in checking the quality of olives by visiting farms or coordinating collection to streamline the process. The cooperatives also have other functions such as representing their members in the GIEs' general assembly and offering farmers assistance with pruning, pesticide application, and arranging crates for transport.

Personally, when my harvest is ready, I call the GIE to ask if they are purchasing olives, and since I am a loyal customer, the GIE manager is familiar with the quality of my olives. As soon as he gives me the green light to bring my olives to the GIE, either they send me the GIE's pick-up truck or I arrange the transportation and I am reimbursed for those costs later.

–Non-member farmer

Just to clarify one thing, even when we talk about cooperatives sales, it is the individual members who sell their olives to the GIE on their own behalf. They do not come as cooperative members, they bring their olives, take the money and leave. They do not go through the cooperative as an intermediary for the sale, they prefer to sell directly to the GIE in order to be paid on the spot and to cover their agricultural expenses.

–GIE president

Cooperatives and farmer members might have needed more support to engage with the GIEs as originally envisaged.

For the new processing units to operate effectively, it was envisaged that cooperatives would work closely with their member farmers to supply the units with a sufficient quantity of olives for crushing. Cooperatives were also expected to work together to provide oversight over the management of the GIE, especially at the annual general assembly. However, as mentioned earlier, the Catalyst Fund activity was implemented in a short timeframe, towards the end of the Compact. As a result, the technical assistance provided to cooperatives may have been insufficient for them to fully understand how the GIE was supposed to operate and how they were expected to engage with it and with farmers. More time also might have created a strong working dynamic between the cooperatives at the GIE level.

A related challenge is that many of the cooperatives that formed the GIE were new. Specifically, the project created several new olive cooperatives by encouraging farmers who attended trainings to form cooperatives or by encouraging existing associations such as water user associations or informal associations to form olive cooperatives. The project also encouraged existing non-olive cooperatives—for example, bee, milk, and women’s handicrafts cooperatives—to expand their focus to olive and olive oil production and become members of the GIEs (since many of their members cultivated olive trees). (Some of the pre-existing non-olive cooperatives that joined the GIE no longer work in their original specializations, focusing instead exclusively on olive production.) The cooperatives that were not yet active in the olive sector had little experience in this sector and many of their existing members did not cultivate olives commercially, which meant that they required more support than the project was able to provide.

At the farmer level, training for olive farmers was focused on cultivation and harvesting and not how they were expected to engage with cooperatives and the GIE. Many farmers thought that they simply had to make an up-front monetary contribution and they would benefit from the GIE, and did not understand how they were expected to engage with the cooperatives to pool their olives together for sale to the GIE. Some GIE presidents also thought that farmers do not fully understand how the GIE works and do not realize that the GIE cannot succeed unless farmers sell the olives to the GIE. National-level stakeholders also noted that the culture of cooperation among farmers varies across geographic areas, which is another factor that

In the GIEs that are not working well, you find that the equipment is in good working order, the production of olives is available, but there are social and tribal conflicts. This can be blamed mostly on the fact that the Catalyst Fund was rushed. There wasn't enough time to collect cooperatives and to create a good working dynamic between them at the level of the GIE.

–National-level stakeholder

We need to raise awareness of the cooperatives that are the basis of the GIE. They must understand—what is the GIE? What is a cooperative? To succeed in this project, we must be in solidarity, but there is no spirit of collaboration. The cooperatives should have been informed of the objectives of the GIE from the beginning.

–GIE president

might help explain the variation in farmer member engagement and GIE performance across GIEs. More time might have helped build farmers' trust in cooperatives and overcome socio-cultural obstacles to engaging with them, at least in some areas.

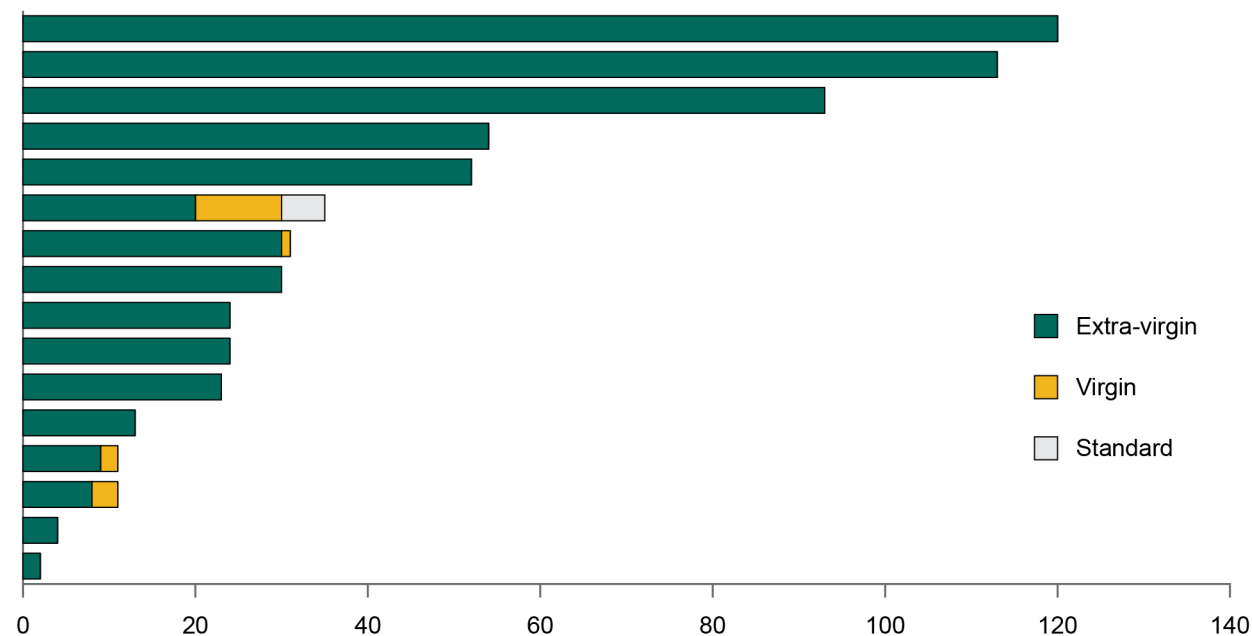
D. Olive oil production and sales

The Catalyst Fund was designed to enable GIEs to produce high-quality (extra-virgin) olive oil from the olives that they purchased. It was expected that this oil would be sold at attractive prices, so that the GIE would earn profits that it would return to farmers as dividends. In this section, we describe oil production and sales by the GIEs.

According to survey respondents, the GIEs almost exclusively produced extra-virgin olive oil in 2017–2018.

The 16 GIEs that produced olive oil for sale in the 2017–2018 crushing season produced a mean of 36 tons of oil (median 24 tons), with substantial variation across GIEs (Figure V.5).¹² Across all these GIEs' production of 641 tons in 2017–2018, almost all production was extra-virgin, according to the GIE survey respondents.¹³

Figure V.5. Tons of oil produced, 2017–2018 season



Source: 2018 GIE survey.

Note: Each bar represents one GIE.

¹² Restricting to the 15 GIEs that reported the amount of oil produced in both seasons, the amount produced increased in 3 GIEs and decreased in 12 GIEs between 2015–2016 and 2017–2018. The total amount produced across these GIEs decreased by about 25 percent, in contrast to the increase in the total tons of olives purchased over the same period. This likely reflects lower average oil yields per quantity of olives in the 2017–2018 season.

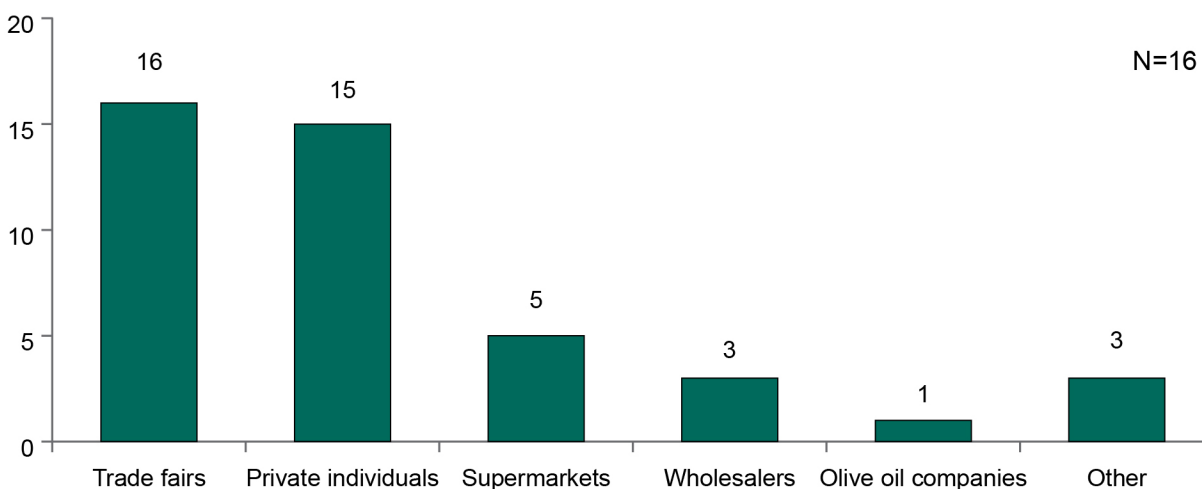
¹³ This classification is self-reported; in Chapter VI we report the findings from olive oil testing, comparing the results to technical criteria for extra-virgin oil. Those findings suggest that the GIEs are over-reporting their production of extra-virgin olive oil.

GIEs have struggled to sell the olive oil they produce and have large volumes of unsold inventory.

The project envisaged that the GIEs would sell their olive oil in markets that olive farmers had traditionally not been able to access, such as domestic supermarkets, olive oil companies, or the export market.¹⁴ (Some GIEs have succeeded in selling to these markets, but the volumes sold remain limited and are variable from year to year; few GIEs have long-term contracts with these types of buyers.)

In the 2017–2018 season, most GIEs reported selling to trade fairs and private individuals (which presumably involved small quantities), and only a few sold to supermarkets or olive oil companies (Figure V.6). Five GIEs reported that they exported olive oil in 2018 (not shown); in the GIE survey we did not ask about quantity exported, but based on interviews with three of these GIEs the amounts exported were generally small (around 5 tons or less) and markets included the Middle East and France. These connections were often made at international trade fairs.

Figure V.6. Number of GIEs selling to various types of buyers, 2017–2018 season



Source: 2018 GIE survey.

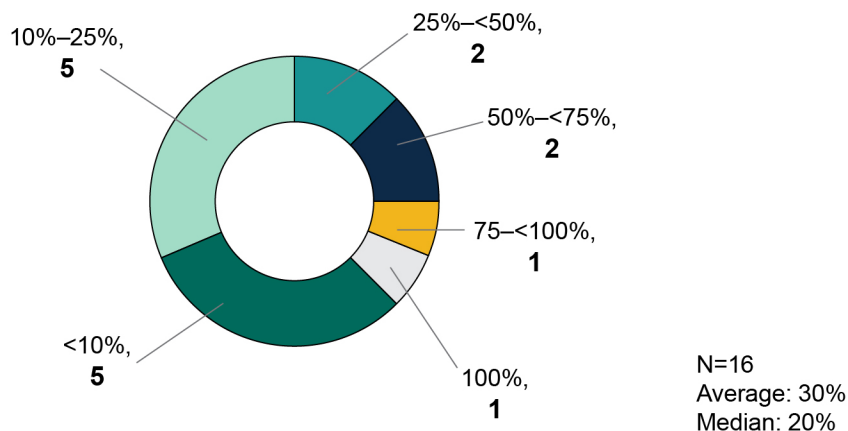
Because volumes sold have been limited, GIEs typically have substantial volumes of unsold oil left in inventory at the end of the season and have struggled to sell it at a price that would be profitable. Focusing on extra-virgin oil, which accounts for the vast majority of production according to GIE leadership, most GIEs had sold less than one-quarter of the oil produced in the 2017–2018 season by the time the survey was conducted in late 2018, at least nine months after the end of the season (Figure V.7). Looking at total production across all the GIEs, only 16 percent of the 619 tons of extra-virgin oil produced in 2017–2018 were sold by the survey date.¹⁵ (The average estimated value of this inventory was substantial—about 1.6 million dirhams

¹⁴ The GIEs sell some oil to individual local consumers, but typically in small quantities and only in a limited window soon after the olives are crushed because these consumers prefer freshly-produced oil.

¹⁵ As shown in Figure V.5, five GIEs produced some virgin oil and one GIE produced standard oil in the 2017–2018 season, all in small quantities. Almost none of this oil had been sold by the survey date.

[about \$160,000] per GIE, compared to average revenues of about 2.4 million dirhams [about \$240,000] for the season.) One GIE president noted that, despite being stored in appropriate conditions, the quality of the olive oil begins to deteriorate after a long storage period, so that it becomes even more difficult to sell profitably. GIEs typically eventually sell their oil stocks in bulk, for relatively low prices.

Figure V.7. Percentage of extra virgin olive oil produced in the 2017–2018 season sold by late 2018, per GIE



Source: 2018 GIE survey.

GIEs’ olive oil might not be competitively priced on local and export markets, which is an important barrier to selling the oil.

GIEs might be struggling to sell their olive oil because it is not competitive on the Moroccan market, for two main reasons. First, there is strong competition from cheap imported oil. For example, in 2017–2018, a local wholesaler imported a large quantity of Tunisian olive oil and sold it at prices far below those of Moroccan olive oil (the price of Moroccan olives was high in this season because of external conditions, further exacerbating the price difference). Second, the GIEs’ production costs are higher than costs faced by many other Moroccan producers. For example, many GIEs cover transport costs for olives, the processing unit’s advanced equipment uses a lot of electricity, GIEs must pay interest on ASM loans, and they use more modern packaging and labelling. Although they produce higher-quality oil than many of their competitors, many local consumers are not willing to pay a premium for this higher-quality oil. Some respondents suggested that local consumers might also prefer the taste of traditionally-crushed olive oil, to which they are accustomed. GIE-produced olive oil may also struggle to be competitive in some international markets (for example, the European market) given subsidies provided to domestic olive oil producers in some countries.

GIEs also lack experience in marketing and do not have a formal marketing strategy.

Several GIE presidents and cooperative leaders suggested that, in retrospect, the project should have had a more explicit focus on markets. This could have included providing additional technical assistance to the GIE leadership in marketing, devising a financial operating model that

would enable the GIE to hire a manager with marketing expertise, and developing a comprehensive marketing strategy to develop and promote the GIEs' brands of olive oil. Ideally, this marketing strategy would have established relationships and contracts with buyers at the outset (although it is unclear if that would have been feasible given that the GIEs were new to the olive oil market).

We explored GIEs' marketing efforts as part of the GIE survey. Of the 16 GIEs that produced oil for sale in 2017–2018, only five had a written business plan (all of which updated their plans at the start of the crushing season). Some of the other GIEs had more informal plans, while others were discouraged from making plans by overarching challenges such as strong competition and high debts. Eleven of the 16 GIEs had a functioning website, which might help connect them to potential buyers.¹⁶ The most common marketing activities in 2017–2018 were local fairs (all 16 GIEs), media advertising (8 GIEs), and international fairs (6 GIEs).

There are still many difficulties in marketing our olive oil, which explains the 92 tons of oil in stock from the previous year. Oil that has been in stock for over a year loses quality substantially despite being stored with international standards of health safety. Additionally, customers demand the oil that has been freshly crushed, and nobody wants to buy old oil from the previous year. Recently we lost an opportunity to sell to a Saudi investor who wanted to buy a large quantity oil because when I told him that the oil in stock was crushed the previous year, he canceled the sale and purchased oil from another supplier.

–GIE president

There are many obstacles to commercialization. First there is the fact that in Morocco the state does not protect farmers against potential threats, unlike Spain, for example, which subsidizes its farmers. Another obstacle is the cost of olive oil production for the GIE, which is high compared to other producers, since we produce a high-quality oil that meets all the standards of health safety, but on the market we have to compete with the traditional producers in order to sell our product.

–GIE president

There is a problem with the taste of the olive oil produced by the GIE—most people do not like this taste, they prefer the oil produced by the traditional units, and are not interested in virgin or extra virgin olive oil.

–Member farmer

¹⁶ We attempted to find these websites using key search terms in French and were only able to find three full websites dedicated to specific GIEs. We found Facebook pages for a further 11 GIEs.

E. Benefits for farmers

The GIEs were expected to increase farmers' incomes primarily by distributing dividends from olive oil sales (farmers would receive these dividends in addition to up-front payments for their olives). As we discuss below, this has not occurred. We explore the reasons for this and describe other, more modest, ways in which farmers might have benefited from the GIE.

The GIEs have not yet substantively affected farmer income because they are operating at low capacity, have struggled to find profitable markets, and are still paying off the loans taken to establish their units.

None of the GIEs distributed dividends to farmers in the 2017–2018 season, and few (if any) ever distributed dividends,¹⁷ for three main reasons. First, the GIEs are operating well below capacity, so the volume of oil produced has been limited and costs have been high (per-unit costs decrease as the volume crushed increases). Second, the GIEs have struggled to find markets to which they can sell their oil (especially inventory remaining after the end of the season) at attractive prices. Third, the GIEs have had to prioritize using profits (if any) to pay off the CAM loan used to establish the GIE. We discussed the difficulties with purchasing olives and marketing the GIEs' oil earlier; here, we discuss the challenges posed by loan repayments in more detail.

As mentioned in Chapter I, the GIEs contributed 20 percent of the cost of establishing the new processing units, which comprised a contribution from member cooperatives (5 percent of the total) and a loan from CAM (15 percent of the total). The co-contribution from the GIEs, which was large in monetary terms, was designed to incentivize the GIEs and member cooperatives to devote a strong effort towards the success of the GIE.

No one doubts that produce a higher-quality oil and obtain a higher yield compared to other units, but the absence of a market to sell to it is the main challenge to achieving significant profits.

—Member farmer

However, without exception, GIE presidents viewed the large initial debt incurred by the GIEs as a major flaw in the design of the activity, and most pointed to the servicing of CAM loans as one of the biggest challenges facing their GIE. Because of the GIEs have faced challenges in terms of management, marketing, and cooperative engagement that have limited their profitability, their modest profits have been used almost exclusively for debt repayments, precluding them from distributing dividends to farmers as they were designed to do. In some GIEs, olive oil production and sales are insufficient to meet the annual repayments on the debt after accounting for other expenses, and GIE presidents are concerned that the loan will never be repaid. When payments are missed, CAM typically increases interest rates on the outstanding loan amount as a penalty,

¹⁷ In the 2017–2018 GIE survey, three GIEs reported distributing dividends in 2015–2016 and one reported distributing dividends in 2016–2017. However, based on interviews with GIEs, we believe that some of these payments to cooperatives were not dividends to be distributed to farmers; instead, they were loans or refunds to cooperatives. Therefore, at best no more than one or two GIEs (and possibly none) ever distributed dividends since they were created.

further worsening the financial situation in these GIEs. Some GIE presidents suggested that, as a result of the large outstanding debt, farmers were hesitant to engage with the GIE because they feared that CAM would seize the GIEs' equipment and/or olive oil produced at the GIE.

The GIE survey data confirm the large burden posed by the CAM loans. In the 16 GIEs that produced olive oil for sale in 2017–2018 and provided information about CAM loans, the average loan size was 2.3 million dirhams (about \$230,000). On average, these GIEs repaid about 400,000 dirhams (about \$40,000) in 2017–2018, which was about one-quarter of their annual costs.¹⁸ Ten of the 16 GIEs reported that the GIE was up-to-date on the loan repayment; however, even these GIEs only expected the loans to be paid off between 2020 and 2025.

Of course, this debt poses many problems to us considering the amounts which we must pay, in addition to the interest and sometimes the surcharges. These are big sums which weigh on all the work of the GIE and do not leave a profit margin to reimburse farmer members or to have working capital that can be used for future investments.

–GIE president

From my experience as president of this GIE, I can say that the 15 percent loan from CAM was a serious mistake in this project and the main obstacle that has prevented the growth of all the GIEs. We worked very hard to pay off this debt and still have not been able to do so. Even worse, this loan will take over 10 years to pay off and by then, our machines will depreciate completely, and our efforts will not have helped the farmers in the area but rather CAM.

–GIE president

The farmers joined the cooperatives based on the promise that the GIE will pay them dividends, and over time, it turned out that the promises were false since the GIE never distributed profits and thus farmers are gradually starting to lose trust in their cooperatives. This lack of trust is the main obstacle to the smooth running of cooperatives.

–Cooperative leader

Farmers have experienced modest monetary benefits from using tolling services at the GIE and from a more attractive market for their olives, even in the absence of dividends.

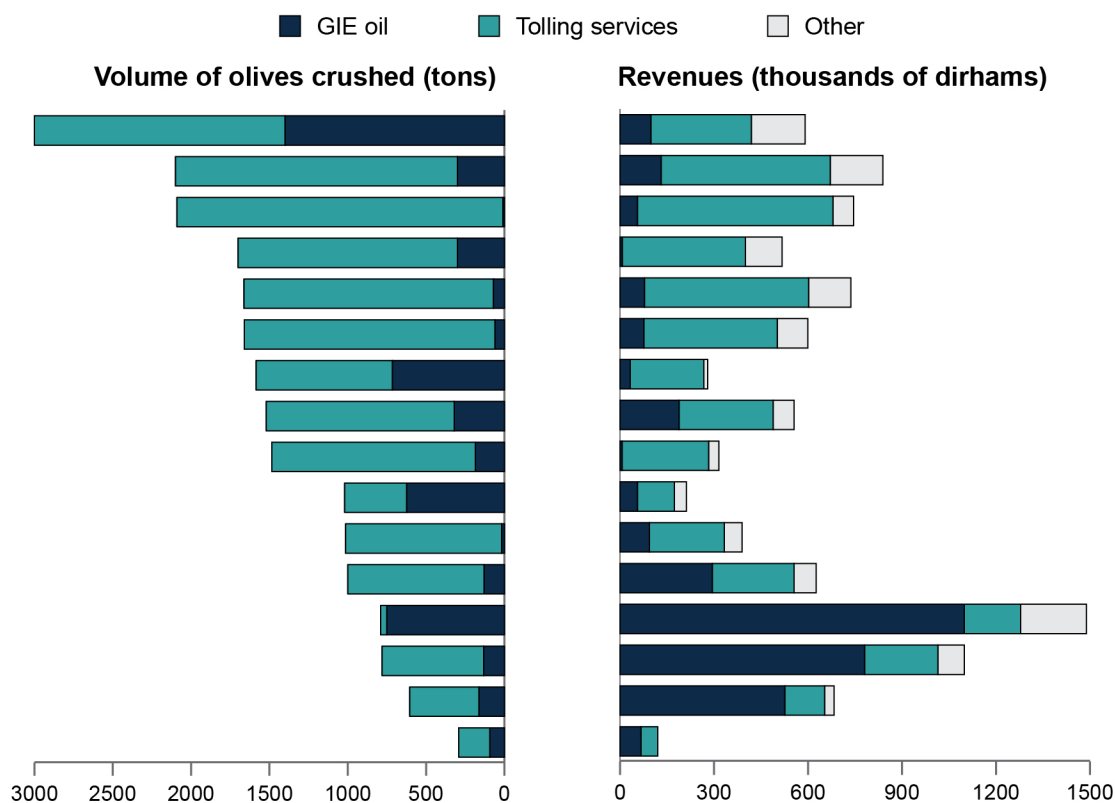
Many member and non-member farmers in our focus groups reported crushing at least a portion of their olives at the GIEs' processing units for their own consumption, to distribute to friends or family, and for sale. Most farmers who used the GIEs' tolling services expressed a high degree of satisfaction with these services. Farmers prefer crushing their olives at the GIEs compared to other units because it takes less time to crush the olives compared to smaller-capacity units, and

¹⁸ These averages include four GIEs that did not report making any loan repayments in 2017–2018.

because the oil yields and oil quality are higher thanks to the GIEs' modern equipment.¹⁹ Several farmers specifically appreciated the cold crushing techniques of the GIE. In 7 of the 16 GIEs that offered tolling services in 2017–2018, farmer members benefit from slightly lower charges for tolling and typically view this as a major benefit of membership.

Most GIEs are heavily reliant on revenue from tolling services, which typically accounted for most of the volume crushed and most revenue in the 2017–2018 season (Figure V.8). On average, about three-quarters of the volume crushed at each GIE and more than one-half of revenues were from tolling services, although a handful of GIEs were less reliant on providing tolling services to drive their revenues. GIE presidents would prefer not to be heavily reliant on providing tolling services because it is not very profitable given the high cost to the GIE (in terms of wear-and-tear on the machines and high electricity use for crushing small volumes). However, many feel that they do not have a choice given their lack of working capital to purchase olives and high annual expenses, especially related to debt servicing. Some GIEs also feel obliged to offer tolling services to farmers so that they remain connected to the GIE and receive at least some benefits to compensate them for their initial investment, in the absence of dividends.

Figure V.8. Volume of olives crushed and revenues, by service type, 2017–2018 season



¹⁹ However, some farmers still preferred to use traditional units because (1) they prefer the taste of oil from traditional units; (2) traditional units will accept any volume for crushing whereas GIEs require a minimum volume to operate the machines or require farmers to combine their olives with other farmers; (3) traditional units charge a lower price for crushing; and (4) some farmers are located far from the GIE and most GIEs do not include transportation costs in the price they charge farmers for crushing.


Source: 2018 GIE survey.

Note: Each bar represents one GIE. Other sources of revenue include table olives (3 GIEs), pomace (15 GIEs), the flesh of crushed olives (6 GIEs), renting out equipment (9 GIEs), and other miscellaneous sources.

In addition to benefitting from tolling services, farmers who sell their olives to the GIE despite the challenges with receiving up-front payments have benefitted in several ways. As discussed earlier, these include the following: (1) free transportation of olives to market (the GIE) and other complementary services; (2) an above-market price for olives, in particular for olives that have a high yield of oil; and (3) the GIE is perceived to deal with farmers more fairly than do other buyers.

Many stakeholders also believe that the GIEs have contributed to a new culture of quality among olive farmers.

This new culture of quality has occurred through increased awareness of (1) appropriate harvesting techniques; (2) correct storage and transport of olives; (3) the importance of crushing soon after harvest; and (4) the high potential value of olive production. Stakeholders suggested that this might have contributed to an overall improvement in olive and olive oil quality, although the effect on farmers' incomes has been limited (in large part because of an absence of attractive markets for high-quality oil).



The olives crushed at the GIE produce a significantly higher yield compared to those crushed at traditional processing units. The difference is 6 more liters of oil per 100 kilograms of olives, so if you have 40 tons of olives, you will definitely lose money if you crush them at a traditional unit.

–Non-member farmer

The most important objective is the production of very good quality oil. With the GIE processing unit, farmers crush their olives immediately after the harvest and do not store them for a long time before crushing. Also, the crushing speed has helped improve the quality of olive oil. Now, a farmer can crush a ton of olives in half a day, while it used to take at least four days at a traditional unit, or sometimes there would be a month-long wait which would result in damaged olives.

–Non-member farmer



I can say that the GIE did not affect farmers' incomes, but it deeply impacted the agricultural activities of the farmers in this area, because now farmers are aware of the importance of olive trees and the importance of producing high-quality oil.

–Member farmer

The GIE has achieved some, but not all, of its objectives. The most important objective, which is the improvement of farmer incomes, has not yet been achieved. However, thanks to the unit and the rehabilitated irrigation infrastructure, farmers apply training techniques and now produce high-quality olives and olive oil.

–Cooperative leader

Before we used to transport the olives in bags, and we stored them for 3 to 4 months after the harvest before crushing them, producing a very bitter oil. Today, thanks to the awareness raised by the project, many farmers have changed this habit.

–Member farmer

F. Sustainability

Here we explore the conditions required for the GIEs to succeed and be sustainable in the long-term.

To succeed in the long term, GIEs will have to repay their debts, find new markets, and secure working capital; it is also important for them to diversify their activities.

The likelihood of the GIEs being sustainable in the long term depends on their ability to distribute dividends to member cooperatives. Until then, member farmers are likely to remain discouraged and engagement with the cooperatives will remain limited, and the GIEs will struggle to recruit additional active members.

To distribute dividends, the GIEs will have to overcome their debt obligations so that profits are available for distribution. This is also important for the GIEs' broader financial sustainability; most of the GIE presidents we interviewed reported that their GIE was able to cover the operational costs of its processing unit (such as salaries, electricity, and maintenance), but only some were able to service their CAM debt obligations.²⁰ The GIEs also need to increase their production and profits by finding attractive and reliable markets (for their large inventory of olive oil, as well as future production) and securing sufficient working capital.

²⁰ We attempted to use information about costs and revenues from the GIE survey to quantitatively assess the extent to which GIEs were able to cover their costs and were profitable in the 2017–2018 season. However, this proved challenging because of differences in accounting practices across GIEs, and because some costs and revenues did not correspond to the season we asked about. (For example, some payments for olives and/or ASM loan repayments recorded in 2017–2018 might be deferred payments for olives purchased in the 2016–2017 season.) Therefore, we rely on qualitative reports that GIEs were largely able to cover their operational costs but not necessarily their debt repayments.

Several GIE presidents suggested that it was also important for the GIEs to diversify their activities. This could include, for example, producing more table olives and olive by-products, producing or selling other non-olive related products on the GIE premises (such as processed vegetables or fertilizer), renting land to cultivate olive saplings for sale, and providing off-season transportation services to the community using the GIEs' trucks. Some of these activities would extend the GIEs' typical operating season beyond the current two or three months and enable it to access new revenue streams. This could also enable the GIEs to attract and retain higher quality staff—especially professional managers—by offering higher salaries and more stable jobs.

Personally, if I must contribute 6,000 or 7,000 dirhams [about \$600 or \$700] to this project, I would rather purchase an ox for that money and sell the milk. It would be a better investment, since farmer members have not received any dividends from the GIE.

–Non-member farmer

We need to diversify and create other activities—we are currently working on creating processing units for table olives, soap and other products deriving from olives. This will improve our profitability and extend the period during which the GIE is active because working for only three months in the year is difficult. We need to at least have an activity that extends over 9 or 10 months.

–GIE president

The GIE only works two months a year, which is not enough to repay its debts. The GIE needs to take the initiative to conduct other activities so that it operates at least 5 to 6 months, which would allow it to diversify its revenues and create sustainable job positions. There are several activities that generate added value and that are simple, such as the use of trucks for transport services in the off-season.

–GIE president

G. Reassessment of end-of-compact ERR estimates

MCC conducted cost-benefit analyses for the activities in the irrigated and rain-fed olive areas in 2014, soon after the end of the Compact. As we described in Chapter II, these models incorporated costs and benefits for the Catalyst Fund investment. They resulted in estimated ERRs of 10 and 24 percent for the irrigated and rain-fed olive areas, respectively, over a 20-year time horizon. Here, we use the evaluation findings to reassess the assumptions underlying the Catalyst Fund component of the end-of-Compact cost-benefit models in olive areas.

The assumptions underlying the benefits of the Catalyst Fund investment in MCC's cost-benefit models did not hold; these benefits were much more modest than expected.

The cost-benefit models assumed that there would be a rapid increase in the fraction of farmers using modern processing units compared to traditional units as a result of the project. For example, in irrigated olive areas, the model assumed that all farmers who crushed olives would

use modern units starting the year after the end of the Compact.²¹ The model also assumed that modern units would produce a higher proportion of extra-virgin olive than traditional units, which has a higher market value than lower quality grades. Further, farmers would crush a larger amount of olives as a result of the higher yields resulting from other project interventions in these areas. Together, increased production of extra-virgin oil through modern units and the increased volume crushed would increase profits from olive oil sales (despite the higher costs of using modern units), contributing to an overall increase in farmer income.

However, the findings described earlier suggest that the GIE processing units did not make the envisaged contribution to the project benefit streams, for two main reasons. First, the extent to which farmers in the broader catchment area used these units was limited. Relatively few farmers sold olives to the GIEs, and the overall amount of olives crushed by the GIEs was modest (relative to their capacity) even if one includes tolling services. Further, qualitative data from farmers suggests that the use of traditional units was still common, even five years after the end of the project. Second, the benefits to farmers who use the GIE processing units have been limited, largely because of challenges with finding attractive markets for the oil produced and the GIEs' use of profits to repay their debts. More broadly, the assumption that increased production of extra-virgin olive oil would lead to substantially higher profits for farmers might not hold, because consumers in the Moroccan market might not be willing to pay more for this type of oil and might even prefer the taste of oil crushed at traditional units. Overall, the benefits of the Catalyst Fund investment are unlikely to have been commensurate with its costs given the relatively small benefits for farmers that we described earlier. (Even if the GIEs operate at higher capacity and return more profits from oil sales to farmers in the future, these benefits will be limited once discounting is applied because they will only occur many years after the end of the Compact.)

²¹ These presumably included other modern processing units besides GIE units because the cost-benefit model assumed that only about 29 percent of the oil produced in these modern units would be extra-virgin (the highest quality grade), whereas the GIE units were designed to mostly produce extra-virgin oil. It is unclear what proportion of olive production the model assumed would be crushed at GIE processing units specifically.

VI. FINDINGS ON OLIVE OIL QUALITY

The modern olive oil processing units established by the Catalyst Fund were expected to increase olive oil quality by upgrading processing techniques relative to traditional methods. To assess the degree to which these units were producing high-quality olive oil, we tested the quality of olive oil samples collected from them in October or November 2018.

A. Quality criteria

Virgin olive oils are the product of crushing olives by mechanical or physical means, under conditions that do not alter the oil (International Olive Council [IOC] 2018a). Because this is how the GIEs produce olive oil (they do not process the oil chemically or thermally), we sought to classify their olive oil using virgin olive oil classifications.

The highest quality of virgin olive oil is extra-virgin, followed by virgin, ordinary virgin, and lampante virgin (which is not fit for human consumption, but may be used for technical applications). The quality of virgin olive oil is assessed using 10 criteria (IOC 2018a), but for the purposes of this analysis we focus on the 5 main criteria that are used to identify and categorize commercial grade olive oil (Table VI.1 maps these criteria to the quality categories):²²

- **Percent of free acidity.** High levels of free acidity can be caused by fruit fly infestations, delays between harvesting and crushing (especially if olives are bruised or damaged before crushing), fungal diseases, and poor extraction methods (Olive Oil Source 2019). As the percent of free acidity increases, the taste and smell of the olive oil worsens.
- **Peroxide value.** The peroxide value is a measure of the oxidation of olive oil, particularly the primary phase of oxidation, as it is exposed to air (Olive Oil Source 2019). Minimizing oxidation of olives is important because oxidation causes rancidity in olive oils.
- **Ultraviolet absorbency.** Ultraviolet absorbency is used to assess the quality and authenticity of olive oils. High levels of ultraviolet absorbency indicate secondary stages of oxidation of oils (degradation), as well as adulterations from technological processing (inauthenticity) (Borello and Domenici 2019; Houshia et al. 2014).
- **Median fruity attribute.** A panel of trained tasters assigns values for the perceived intensity of the “fruity attribute” (flavor of the olive fruit) present in the oil (IOC 2018b); more intense fruity flavors are more desirable in terms of quality. Each member of the panel assigns a value of less than 3 for delicate intensity of a fruity flavor, between 3 and 6 for a medium intensity, and between 6 and 9 for robust fruity flavors. The median is then calculated from the range of values assigned by the members of the panel.
- **Median defect attribute.** The sensory panel also assigns values for any negative flavors (defects) detected in the oil, such as muddy sediment, musty-humid-earthly, rancidity, winey-vinegary, and so on; any defect flavors are undesirable from a quality perspective. For each

²² The following five characteristics used for categorizing olive oil were omitted from this analysis: (1) moisture and volatile matter, (2) insoluble impurities in light petroleum, (3) trace metals, (4) fatty acid ethyl esters, and (5) phenol content.

“defect attribute” detected, panel members assign values based on the intensity of the defect in the same way as for the fruity attribute (values less than 3 indicate low intensity, values of between 3 and 6 indicate medium intensity, and values of between 6 and 9 indicate robust defects). If a panel member detects more than one defect, the highest value is used when calculating the median defect attribute.

Table IV.1. Virgin olive oil quality criteria and thresholds

Criterion	Extra virgin	Virgin	Ordinary virgin	Lampante virgin
Free acidity (oleic acid)	≤0.8%	≤2%	≤3.3%	no limit
Peroxide value (peroxide oxygen millequivalents per kg of oil)	≤20	≤20	≤20	no limit
Ultraviolet absorbency (270nm)	≤0.22	≤0.25	≤0.30	no limit
Median fruity attribute	>0.0	>0.0	no limit	no limit
Median defect attribute	0.0	≤3.5	≤6.0 ^a	no limit

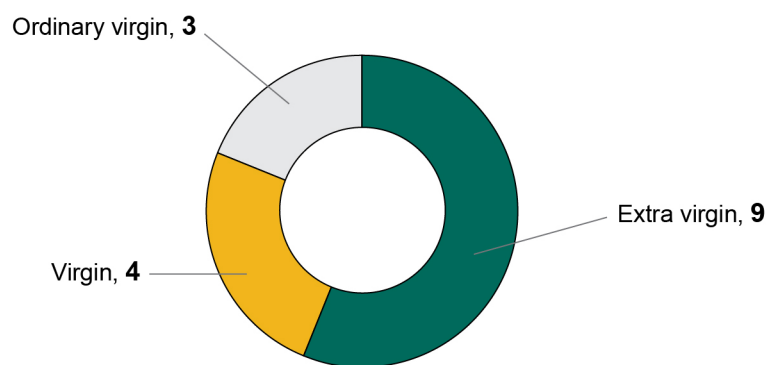
Source: IOC, June 2018a.

^aOr when the median defect attribute is less than or equal to 3.5 and the median fruity attribute is equal to 0.0.

B. Results

We tested samples from 16 GIEs, requesting that each GIE provide that highest quality oil in its tanks. The laboratory analysis revealed that about half (9 GIEs) produced extra-virgin olive oil, one quarter of the GIEs (4 GIEs) produced virgin olive oil, and the remainder (3 GIEs) produced ordinary olive oil (Figure VI.1).

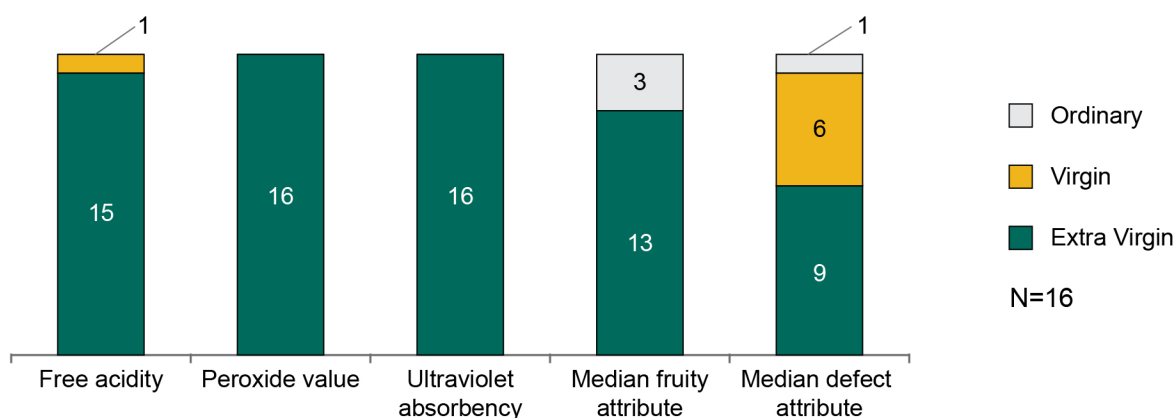
Figure VI.1. GIE olive oil classification (number of GIEs)



Source: Testing of olive oil samples from the 2017–2018 season.

Figure VI.2 shows the results of the analysis by criterion for each olive oil category. For example, on the free acidity criterion, the olive oil of 15 GIEs qualified as extra-virgin, and the oil of one GIE fell short of this classification on this criterion, qualifying as virgin. All GIEs met the extra-virgin criteria for peroxide and ultraviolet absorbency.²³ GIEs that produced olive oil of quality lower than extra-virgin mostly fell short on the fruity attribute criterion (3 GIEs) and defect attribute criterion (7 GIEs). (These criteria are correlated: defect flavors were detected most commonly in oils that ranked lowest on the fruity attribute [not shown]). Defect flavors noted by the sensory analysis panel included winy-vinegary (4 GIEs), rancid (2 GIEs), and amurca (the bitter, dark watery sediment that settles out of unfiltered olive oil, 1 GIE).²⁴

Figure VI.2. GIE olive oil characteristics



Source: Testing of olive oil samples from the 2017–2018 season (16 GIEs).

²³ The minimum requirements for some of these chemical criteria might be too crude to distinguish between subtle quality differences in oil quality. For example, the peroxide value criterion is the same (≤ 20) for all three edible virgin olive oil categories (extra-virgin, virgin, and ordinary virgin). This suggests that it can only be used to determine if the oil is very rancid and thus inedible.

²⁴ Defect attributes typically arise from practices such as poor olive harvesting and storage techniques, as well as natural factors, such as unhealthy olives (Bendini et al., 2012). For example, winy-vinegary defects are likely due to sugar fermentation, which occurs when olives are stored in piles for several days. Rancid defects are likely the result of oxidation due to poor oil storage conditions, such as exposure to oxygen or high temperatures. Specifically, the large oil storage tanks that the GIEs use might be too large for storing small quantities of oil without causing oxidation (which could affect the taste of the oil even if the peroxide value is still within the range for edible oil), and the GIEs do not maintain a constant temperature for stored olive oil. The fruity attribute depends on natural factors, crushing methods, and oil storage conditions (oxidation decreases the fruity attribute).

These findings suggest that most GIEs met extra-virgin olive oil standards based on chemical criteria, but some did not meet the sensory-related criteria.²⁵ This could be due to poor olive storage by farmers and/or non-ideal olive oil storage conditions at the GIEs. Based on qualitative data, GIEs are very focused on chemical criteria—especially free acidity, which they can test in-house—and may be unaware of how their oil performs on sensory-related criteria (or that these criteria are necessary to be classified as extra-virgin). This might explain why, in the GIE survey, all GIEs reported that they almost exclusively produced extra-virgin olive oil, whereas the results here suggest that some did not. That said, in interviews, some GIEs indicated that they were aware of factors affecting the taste of the oil, and even reported investing in smaller storage tanks to reduce oxidation from storing small quantities in a large tank. Overall, most GIEs met the extra-virgin sensory criteria, and several have won competitive awards for taste, especially at the Morocco’s major annual agricultural fair (*Salon International de L’Agriculture au Maroc*, or SIAM).

²⁵ To assess which criteria might explain variation in olive oil sales across GIEs, we examined simple correlations between the percent of oil from the 2017–2018 season that each GIE had sold by the survey date and each quality criterion. The strongest correlation was a positive correlation with the median fruity attribute, suggesting that the market might particularly value oil that performs well on this criterion.

VII. CONCLUSION

This report presented the findings from the final evaluation of the FTTP's investments in modern olive oil processing units through the Catalyst Fund. These findings are based on data collected several years after the project was completed. In this concluding chapter, we summarize our findings in the context of the evaluation's research questions and highlight lessons for future projects.

A. Summary of key findings

The key findings related to each research question are summarized in Table VII.1. They reveal that the GIEs are facing several major challenges, in particular: (1) repaying the large initial credit used to contribute to the construction of the processing units; (2) securing enough working capital in time to purchase olives from farmers; and (3) finding markets where they can sell their oil at attractive prices. As a result, the GIEs have found it difficult to pay farmers up front for their olives and have been unable to distribute dividends to farmers from olive oil sales; therefore, farmers have been reluctant to sell olives to the GIE. Five or six seasons after the processing units started to operate, most are still crushing relatively small amounts of purchased olives and remain heavily reliant on providing (relatively low profit) tolling services to cover their costs. A handful of GIEs—typically those with stronger and more dynamic leadership—have been more successful in crushing larger amounts of purchased olives, but even these GIEs have not yet distributed profits to farmers.

Because the GIEs have not distributed profits to farmers, income gains for participating farmers have been limited. Nevertheless, the GIEs have provided some benefits to farmers through the availability of high-quality tolling services and a more attractive market for farmers' olives (the issues with up-front payments notwithstanding). To be sustainable in the long term and have larger impacts on farmers, GIEs will have to operate at higher capacity (in terms of purchased olives crushed) and distribute profits. This will require them to repay their debts, find new markets for their oil (which might require additional support for marketing), and secure working capital for purchasing olives at the start of the crushing season.

Table VII.1. Summary of key findings

Research question	Key findings
<p>1. To what extent are the GIEs established by the Catalyst Fund operating as intended? To what extent are farmers in the GIEs' catchment areas participating in cooperatives that are members of the GIEs, and why?</p>	<ul style="list-style-type: none"> • Most GIEs are not following the envisaged operating model of purchasing olives from farmers through cooperatives and returning profits to them once the oil is sold. Specifically: (1) many GIEs are only purchasing small amounts of olives from farmers (largely due to a lack of working capital); (2) GIEs have not returned profits to farmers (largely because they are paying off their debts); (3) GIEs are purchasing olives from non-member farmers (because member farmers are not selling them enough olives); (4) GIEs are purchasing olives directly from farmers and not through cooperatives; (5) some GIEs rely on a few larger farmers to sell them olives, rather than pooling production from small farmers; and (6) many GIEs are heavily reliant on providing tolling services to cover their costs. • Farmer member participation in cooperatives is limited (in terms of selling olives to the GIE) because members are reluctant to sell their olives to GIEs without up-front payments, and many have become disillusioned because the GIE has not distributed dividends. Cooperatives have not been very successful in bringing farmers together to contribute olives to the GIE, in part because many were newly-formed or new to the olive sector; they may have needed more time and support to operate effectively. Overall membership in cooperatives is also limited in the catchment area of the GIEs; a lack of perceived benefits and high membership fees are key barriers to membership.
<p>2. How, and to what extent, does the level of success vary across GIEs? What factors facilitate or inhibit the successful operations of GIEs?</p>	<ul style="list-style-type: none"> • There is variation in success across GIEs, especially in terms of whether the processing unit is functional and the amount of olives crushed. In 2017–2018, 4 of the 20 processing units were not operated by the GIEs (2 were nonfunctional due to internal conflicts, and 2 were rented out to private operators to help the GIEs repay their debts). A handful of the 16 processing units that were operated by the GIEs purchased relatively large amounts of olives, although some have struggled to sell the resulting oil. Most, however, operated at a lower capacity; some of these derived most revenue from providing tolling services. • The quality of leadership at the GIEs may be a key factor explaining the variation in success across GIEs, together with differences across geographic areas in the culture of cooperation among farmers.
<p>3. How did the Catalyst Fund processing units affect farmers' revenues from olives (total and per tree), total agricultural revenues, and household income? Did these effects vary by farmer characteristics such as sex, age, and pre-project revenues?</p>	<ul style="list-style-type: none"> • Effects on farmers' revenues and income have been limited because GIEs' profits have been used to pay off their debts. Nevertheless, some farmers have enjoyed modest benefits from the crushing units due to the provision of high-quality tolling services and higher prices and lower costs when selling high-quality olives to the GIE (compared to other buyers).
<p>4. Which international quality benchmarks does the olive oil produced by the Catalyst Fund processing units meet?</p>	<ul style="list-style-type: none"> • Most GIEs' oil meet international standards for extra-virgin olive oil, the highest quality grade. However, the oil at a handful of GIEs falls short on sensory criteria (taste and defects) for the extra-virgin grade, even though it meets technical criteria (such as acidity).

Research question	Key findings
<p>5. Besides making modern processing units available, what role have the GIEs played in the development of olive oil processing and marketing? Have GIEs been able to identify new markets and obtain better prices for olive oil, and how have they done so?</p>	<ul style="list-style-type: none"> The GIEs may have contributed to a broader improvement in the culture of quality related to olive and olive oil production. However, the GIEs have had limited success in accessing new markets and selling their oil at profitable prices. Some GIEs have sold oil to new domestic markets such as supermarkets, and some have even exported small quantities. However, the Moroccan market might not sufficiently value extra-virgin oil to be willing to pay a premium for it, which is necessary to cover the GIEs' relatively high costs of production.
<p>6. Have the new GIEs managed to repay the credit used to help fund the establishment of the new processing units? To what extent have they been successful in accessing and repaying additional short- and long-term credit to operate effectively?</p>	<ul style="list-style-type: none"> The GIEs have uniformly struggled to repay the initial credit used to establish the crushing units. This is a major impediment to their operations, which prevents them from returning profits to farmers. Obtaining access to working capital has been very challenging, with GIEs mostly unable to access enough credit at attractive conditions and with the right timing to compete with other buyers for farmers' olives before the start of the crushing season. Most farmers are unwilling to provide olives to the GIE without up-front payments, and would rather sell to other buyers, even for lower prices.
<p>7. What types of government or other external support have the GIEs needed and received to sustain them? What additional support will they need (if any), and will they be able to obtain it?</p>	<ul style="list-style-type: none"> The GIEs received technical assistance for two years after the Compact through UNOPS and continue to receive support through USGAV. However, they still need extensive support with commercialization and marketing—especially support tailored to their specific situations (such as a GIE-specific marketing strategy). It is unclear how the GIEs will receive this support; some expect ANGIEO to play a major role in connecting them with buyers, but this has not yet occurred.
<p>8. Are the Catalyst Fund processing units likely to be sustainable in the long run?</p>	<ul style="list-style-type: none"> To succeed in the long term, GIEs will have to repay their debts, find new markets, and secure working capital. The extent to which they will be able to do this is unclear. Diversifying their activities could help the GIEs extend their operating season, access new revenue streams, and hire permanent managers. Some GIEs have started to do this with support from other donors.
<p>9. To what extent has the GIE/processing unit model been replicated outside project areas and to what degree is that attributable to the Catalyst Fund?</p>	<ul style="list-style-type: none"> The extent to which other GIEs/processing units have been established outside of project areas is unclear. However, any attempt to replicate the Catalyst Fund model should consider adjustments to the model in terms of co-contributions to capital costs, provision of working capital, support for marketing, and sensitization of farmers and cooperatives to engage with the GIE. Some GIEs have generated modest profits despite the challenges they face, indicating that the model does have potential in some cases; however, it might not be straightforward to identify these potentially more successful GIEs before making the investment.

B. Lessons

The program logic suggested that the Catalyst Fund activity would increase farmers' incomes by purchasing their olives, producing and commercializing high-quality olive oil, and returning the profits to farmers. However, we found that the envisaged effects on income have not occurred.

Our findings suggest several lessons for the design and implementation of similar projects in the future, both in Morocco and elsewhere.

The funding model for establishing new postharvest processing units needs to be carefully considered, especially in terms of co-contributions and working capital.

As discussed earlier, stakeholders consistently identified two important flaws in the funding model for the crushing units: (1) the large co-contribution that the GIEs were required to make to establish the units, which led to them being heavily in debt at the outset; and (2) insufficient affordable working capital with the appropriate timing for the GIEs to purchase olives. These features of the funding model did not set the GIEs up for success, especially in the context of the other challenges they faced as new organizations operating the processing units for the first time. Given the other challenges facing the GIEs in terms of management, marketing, and cooperative engagement, a different funding model would not necessarily have guaranteed their long-term viability but might have increased its likelihood.

The large co-contribution was intended to incentivize the GIEs and member cooperatives to devote a strong effort towards the success of the GIE. Although our evaluation does not provide evidence about the validity of this approach in general,²⁶ the findings suggest that the level of the co-contribution was simply too high in this case. Assumptions about the GIEs' initial scale of operations, cash flow, and resulting ability to repay the initial debt may have been too optimistic. For new processing units that represent a major innovation in the local context, like the GIE-operated olive oil processing units, more conservative assumptions might be appropriate in the early years of operation.

Regarding working capital, it might have been challenging to find regular external sources of working capital given that the GIEs were new organizations with no credit history. (In this context, some national-level stakeholders viewed the availability of ASM loans from CAM as a positive achievement, despite its flaws.) Therefore, it might have been important to build in working capital as part of the basic funding or operational model. For example, some resources could have been set aside to provide a working capital fund for the early years of operation. Alternatively, cooperatives could have sought agreement from farmer members to provide a fraction of their production without up-front payments. (This might have required more time and effort for the project to establish well-functioning cooperatives.)

A strong focus on marketing of processed products is critical, even when the products are of high quality.

Our findings suggest that, although most GIEs were producing high-quality olive oil, many were struggling to sell the oil at profitable prices given their relatively high production costs and limited appreciation for high-quality oil on the Moroccan market. Most GIE leadership also lacked the necessary skills and experience in marketing. To be more successful, the GIEs could have received more comprehensive and tailored marketing support. As discussed in Chapter V,

²⁶ Requiring co-contributions for a good could increase its use by placing it in the hands of those who are likely to use it, having a psychological “sunk-cost” effect, or providing a signal of high quality (Cohen and Dupas [2010] summarize this literature).

this could have included additional technical assistance focused specifically on marketing, supporting the GIEs to hire a manager with marketing expertise, and developing a comprehensive tailored marketing strategy around the GIE-branded olive oil. Establishing relationships and contracts with buyers could help convince farmers to forgo up-front payments, thus alleviating the constraints related to working capital.

Encouraging cooperation among farmers often involves major behavior change and needs an early and intense project focus.

The program logic assumed that farmers would actively engage with the GIEs through their cooperatives by pooling their olives together for sale to the GIE. However, our findings suggest that only a small fraction of olive farmers in the catchment areas of the GIEs are members of cooperatives, and most members did not sell their olives to the GIE. It was challenging to create effective cooperatives through the project because farmers in many of these areas were not used to cooperating to commercialize their products. More time and support might have been required to explain how farmers were expected to engage with cooperatives and the GIE, build farmers' trust in cooperatives, and overcome socio-cultural obstacles to engaging with cooperatives. Similarly, cooperative leaders might have needed more time and support to understand how the GIE was supposed to operate and how they were expected to engage with it and with farmers—especially for cooperatives that were newly-created, or new to the olive sector. It is therefore important for future projects to be realistic about the difficulty of initiating major behavior change among farmers and to devote project resources and time to behavior change.

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Appendix:

Responses to stakeholder comments

Comment	Evaluator Responses
<p>There is a reference to a culture of quality from "increased awareness", but it's unclear where the awareness is coming from. I'd like to see some greater clarity in this section about whether this awareness is through formal trainings/TA or through a trickle of information from the GIE outwards.</p>	<p>We have edited to clarify that this increased awareness was both from the establishment of GIEs and the complementary trainings. (We are unable to disentangle the relative contributions of these interventions given that they were rolled out simultaneously.)</p>
<p>In case I don't come back to this later in my comments, I'd like to have some exploration of the timeliness of debt servicing plans in the original loans from CAM. Did the terms of the loans not incorporate the fact that GIEs would need to turnover dividends for the model to be profitable, were the profit estimates overly optimistic, or is there some other reason why the debt servicing is so frequently referred to as a burden.</p>	<p>We have not seen the original debt servicing plans, but the perceived burden of this debt is high because GIEs have not been very profitable since they were created due to challenges with management, marketing, farmer engagement, and working capital. With greater profits, the GIEs would have been able to pay off their debt sooner and/or would have been able to return dividends to farmers at the same time as paying off the debt. Instead, any modest profits that are generated have been and will continue to be diverted to debt repayments. Given that many GIEs have fallen behind with their payments, it seems likely that the assumptions about the GIEs' profit trajectory were too optimistic.</p>
<p>I'm a bit confused through the Executive summary (about to continue reading the full report), at the regular insistence at the amount of debt being the flaw in the project design. If 80% of the cost of the facility was subsidized by MCC/GoM, how in the world could this operation ever be remotely financially viable in the private sector where no such subsidy exist (or even where some kind of subsidy it exists, most surely doesn't approach 80%). A case might be made that the timing or structure of the debts was poorly drawn up, but unless this was extremely outside industry standards, my reading is that it points to much broader flaw in the profitability of this kind of venture, at least under the given structure (leadership, market strategy, other points you refer to elsewhere in the report). I would suggest a more detailed QA/other review by a team member with specific experience in commercial agricultural finance to improve readability and ensure the over reliability of the findings in this respect, as it seems to be a primary finding of the report, but in places does not seem well defended or well explored.</p>	<p>The GIE model is a social one and not necessarily the most profitable way of producing olive oil; it is not valid to compare the GIEs to olive oil producers in the private sector, which likely operate at a larger scale and with professional management and marketing staff. Although MCC/GoM paid for most of the capital costs to establish the GIEs, the GIEs' co-contribution was still substantial in monetary terms. As noted above, it was very challenging the GIEs to turn a profit even after several years given the challenges they faced as new organizations, and what limited profits they produced were diverted to debt repayments. Had their capital costs been fully covered the GIEs would still have faced many challenges (for example, challenges related to marketing), so there is no guarantee that they would have been substantially more profitable. However, modest profits could have been used for other purposes besides debt servicing (like working capital or dividends), which might have helped to set the GIEs on a more sustainable path. Overall, the issue identified by stakeholders was not related to the timing or structure of the debt, but the debt itself, which they viewed as overly burdensome for new and inexperienced organizations that needed time to establish themselves.</p>
<p>See my comments on introductory section of Irrigation report, as language is repeated here.</p>	<p>Noted and addressed.</p>
<p>Is it possible to give any kind of background on the origin of GIEs in Morocco, why they were created in Morocco, how long this approach has been used for in Morocco, etc.?</p>	<p>We have noted that the legal framework for GIEs in Morocco was established in 1997. A more detailed history is beyond the scope of our report.</p>
<p>I don't have all of this information in front of me, but from my understanding, the Catalyst Fund was added to the Compact near the end of the Compact period (and this appears to be confirmed in Figure IV.1). Reference or clear explanation of this seems conspicuously absent from the introduction of the program's design on page 4</p>	<p>We have made this explicit in the text.</p>

Comment	Evaluator Responses
<p>"New farmer organizations formed by actors external to the community are more likely to fail, due to poor group dynamics, than traditional groups with developed social bonds"</p> <p>Perhaps explored below, but the executive summary did not explore whether the GIEs were plagued by poor group dynamics. Given the salience of this issue (in a sense) in the Irrigation report, it begs the question of whether the formation of these groups neglected the creation or new social bonds or destruction of pre-existing ones. Ignore if this is explore further down in the report.</p>	<p>The issue of group dynamics applies both to farmers cooperating at the cooperative level and cooperatives cooperating at the GIE level. Our understanding from the qualitative data is that both farmers and cooperatives needed more support to encourage active engagement and cooperation, because in many project areas this type of cooperation was new. We emphasize this point in the final paragraph of the executive summary, as well as in the main findings chapter and the conclusion.</p>
<p>Section C here seems like an important place to explore to what extent, if at all, the Government of Morocco continues to support these or other Olive GIEs (or those in other value chains, for that matter), as this has implications for the utility of this research for Moroccan policymakers</p>	<p>As we note in the conclusion, the GIEs received technical assistance for two years after the Compact through UNOPS and continue to receive support through USGAV. However, the resources available are limited given the level of support that some GIEs still need to set them on a sustainable path. For example, several GIEs expressed a need for intensive GIE-specific marketing support from marketing experts, and it is unclear how they will obtain that.</p>
<p>The exploration of the culture shift from tolling services/crushing services to olive oil production seems under-exploited in this report, given how central the tolling services seem to be the current operations of most GIEs. Are crushing services a much more common thing around which farmers have organized in the past? Might the familiarity of this service and the relative unfamiliarity of olive oil production been an important part of the curtailed development of these GIEs, i.e.. they fell back into old habits, not realizing that this new business model would require much more and different efforts on the part of members/leaders? Might this project have been more successful to simply organize around tolling services? Or alternatively, might future projects of this sort consider setting guidelines around the use of tolling services in order to avoid distraction from the core business model?</p>	<p>Because olive oil is an important commodity in these areas for self consumption and as gifts, farmers have always needed crushing services--either at traditional units, semi-modern, or modern units. The GIEs just led some farmers to switch to crushing at a more modern unit. In our understanding there is no formal organizing of farmers around this; farmers just arrive at the crushing unit and use the services. (It is possible that there is some informal coordination because the GIEs need minimum volumes to operate.)</p> <p>More generally, we don't believe that organizing around tolling would have been a valid model for the GIEs. The GIE presidents were clear that profit margins for tolling services are low. They are only offering these services because they are not obtaining enough profits from olive oil sales, and also to some extent to keep farmers engaged in the GIE given that few farmers are selling them olives. Prohibiting these services would likely be counterproductive, as they are helping keep the GIEs afloat financially.</p>
<p>Was the data from the olive oil testing reported back to the GIEs? If not, was there some particular reason why not, and lastly, was there any promise to GIEs (i.e.. in the informed consent) that olive oil results would/might be reported back to them?</p>	<p>While this was neither promised nor requested, the general results were shared with GIEs at the evaluation findings workshop in January 2020.</p>
<p>If you were to take three categories of investments, i) investments related to the tolling/crushing, ii) investments related to olive oil production, and iii) non-olive investments, might there be some takeaway/finding from such an analysis in terms of what GIEs are doing/prioritizing most?</p>	<p>The GIEs are largely not in a position to be making any substantial investments given their poor financial condition. However, more broadly their focus is certainly on olive oil production and moving away from tolling. They are mindful of the importance of diversifying away from olive oil (or even olives) to help extend the operating season and hire more permanent staff, although this is not a major focus for most GIEs.</p>
<p>"Large tanks" rather than "large tasks"</p>	<p>Corrected.</p>

Comment	Evaluator Responses
<p>Does market access / marketing feature in the official role of the ANGIEO, and did the question come up during the interview(s) with ANGIEO leadership? Would be good to understand if this is mainly an issue of GIEs wishing the ANGIEO had a different scope or that they would like it to perform differently/better.</p>	<p>We are unsure if marketing is part of the official role of ANGIEO, but there seemed to be a disconnect between GIEs' expectations and ANGEIO's activities in this regard. ANGEIO views its role primarily as sharing information--for example, if they are approached by a foreign buyer, they will share the buyer's details with the GIEs. But the GIEs would prefer them to play a much more active role in seeking out buyers.</p>
<p>Is it possible to understand to what degree females in these cooperatives are relatively under- or over-represented with respect to other olive cooperatives, say in non-project perimeters or other regions?</p>	<p>Unfortunately we do not have information about olive cooperatives in other perimeters or regions. However, in the baseline survey that another organization conducted in 15 irrigated olive areas (which we use in the irrigation report), very few olive farmers in the sample were female. This suggests that females are relatively overrepresented relative to the overall population of olive farmers.</p>
<p>There appears to be some rogue bold text in the middle of page 25, starting "One President[...]"</p>	<p>Corrected.</p>
<p>A question that keeps coming to mind reading about working capital: Why is it that intermediaries, who I suspect are not large enterprises, are able to solve this issue of working capital (i.e.. pay for olives up front) while the GIEs are not? In effect, is the lower price intermediaries are paying simply a surcharge for the implicit financing cost? And if true that the intermediary price is just the financing-adjusted price, would it not just make sense for GIEs to pay a lower price to farmers and use the additional margin to finance their working capital? Assuming I'm not missing something, this seems to point, again, quite strongly to rigidities/weaknesses in the management of the GIEs being the primary problem, rather than any of the other various issues highlighted in the report. This is not to suggest that ASM loans may not have some structural rigidities (at CAM or elsewhere) but that the revealed ability of intermediaries to manage a workable working capital solution seems to belie the financing question as not the sole explanation of the GIEs struggles.</p>	<p>We do not have detailed data on the operations of intermediaries. However, given the large volumes that the GIEs were designed to process, it's possible that intermediaries are operating at a much smaller scale and therefore have lower working capital needs. Intermediaries have also likely been operating for many years and have had the opportunity to fine-tune their cashflow (they might even have established credit sources).</p> <p>We are not sure we follow the suggestion regarding GIEs paying a lower price to farmers--even a lower price would require them to finance the cost somehow, and it is unclear why farmers would accept a lower price. Further, although it is true that the GIEs pay slightly more for high-quality olives than intermediaries do, this difference is not large; the more critical issue that emerged from the qualitative data is that intermediaries pay up front.</p>
<p>I just spotted that CAM or other financial entities were not interviewed here, is that correct? Of course, it is too late to add this, I presume, but it seems like an important "area for future research" to use the research euphemism, as it would be useful to understand the banks' perspective on ASMs and the challenges of providing working capital to these GIEs.</p>	<p>This is correct--CAM was unfortunately unable to meet with us during two separate trips to Morocco where we attempted to schedule an interview.</p>
<p>It seems like it might be useful to put "% of farmer members selling olives to GIE" on the left hand side of the figure, both because the figure isn't super quick to mentally summarize and become below analysis says things like "a majority of members are not selling to GIEs" but without any of the figures or even a mean. Perhaps it's elsewhere in the report and I've missed it.</p>	<p>We have incorporated this suggestion into the figure.</p>

Comment	Evaluator Responses
<p>The footnote highlights "presidents" buying from "all farmer members" and then selling to GIE. The first sentence in the note is ambiguous if you mean "exclusively from farmer members" (i.e., no non-member purchases) or if you mean "from each every farmer member. I assume the latter.</p> <p>More importantly, if I'm understanding correctly, the president/s is/are basically acting as the financial intermediary/ies who is/are using their own working capital to purchase olives up front and then take a markup when selling to the GIE? If so, is this being done through official channels or as individuals, as is noted in the qualitative citation on page 30?</p> <p>In general, this footnote may require some expounding to become clear.</p>	<p>Upon closer review we believe that we misinterpreted the qualitative data here. We do not have a strong explanation for why this particular GIE purchased olives from every member farmer. At least one of the member cooperatives imposes a minimum amount of sales to the GIE on its farmer members, but it isn't clear whether this applies to all member cooperatives. We have removed the footnote.</p>
<p>I'm still left wondering throughout this report what the obsession is with GIEs not being able to get enough olives or "convince" farmers to sell their olives to the GIE, and similarly with GIEs "needing" farmers to sell their olives to the GIE. Is there some kind of shortage of olives on the open market? Are they not able to purchase olives at market and use those to run their equipment closer to capacity and presumably gain some economies of scale of having such a large, high quality facility. One comment in this vein, on page 31, highlights a president's view that farmers "do not realize that the GIE cannot succeed unless farmers sell the olives to the GIE." Is that accurate? This seems to get things backwards...the GIE cannot succeed without the farmers...my understanding is that the farmers should be the beneficiaries with the GIEs being their representative...if there isn't a clear benefit to farmers, why should they participate?</p>	<p>The GIEs are very committed to operating according to the envisaged social model, where they engage farmers who are members of the cooperatives. They are not driven by a profit-maximizing motive alone, as a private sector business would be. Therefore, in theory they might be able to go to the market and purchase olives themselves, but this would not be in keeping with their mission (further, market prices might be higher than purchasing olives from farmers). Therefore, to "succeed"--which in their view means to follow the envisaged model and return dividends to farmers who sold them olives--the GIEs needs farmers to sell them olives in the first place.</p>
<p>Is it worth highlighting that it could be that both GIEs and their purchasers aren't aware that their oil is not extra-virgin quality? In other words, my interpretation of the term "over-reporting" is that it may be intentional mis-reporting...I would not be surprised if this were not the case.</p>	<p>We are unsure if this is misreporting or over-reporting. In our discussions with GIEs and implementing stakeholders, there was a strong focus on chemical criteria (especially acidity, which they can test for in-house) when describing oil quality. It is therefore possible that other criteria, especially the sensory criteria, are not widely known; they are also expensive to test for.</p>
<p>Is there a figure anywhere in the report showing the trends of purchases/production/sales over time? This footnote was the first time I spotted reference to this information which seems pretty important. I recognize that you might have to limit from your full sample of 20 in order to have consistent pre-post, but that seems like a pretty minor issue.</p>	<p>In drafting the report we carefully considered the extent to which we should show both years of GIE survey data versus one year. (To clarify, these are both "post" years.) Ultimately, we decided that focusing on one year of data in the body of the report would be clearer because the "story" was more about low levels of purchases/production/sales than trends, which could in part reflect differences in external conditions in the two seasons for which we have data.</p>
<p>Below footnote 14 it says "continued" but it doesn't appear that anything is continued. Same with page 36, footnote 18</p>	<p>Corrected.</p>
<p>I think the reference to Figure V.6 is actually to the previous figure</p>	<p>Corrected.</p>

Comment	Evaluator Responses
Is the term "vast majority" accurate based on posterior oil testing?	We have clarified that this is "according to GIE leadership".
The question of unsold stocks begs the question of what they are doing with these large stocks? At a minimum, perhaps they have a strategy of giving oil back to selling farmers in lieu of a dividend. I wasn't able to find any information in the report about how unsold stocks were being handled, at least for the 2015-16 sample where we should have had enough time to follow up on this question, as 2015 oil has surely degraded quite a bit in the meantime, so I wouldn't suspect they are still holding out to see those stocks.	Typically the GIEs eventually sell their stocks in bulk, for low prices. We have clarified this in the report.
Did the GIEs provide the research team with the URLs, to try to connect directly? It seems to me that even in the best of cases, Google searches of "huile d'olive marocain" are not the likely audience of such website, but rather potential buyers who are already aware of the given brand name/GIE.	We searched for names of specific GIEs on Google, Facebook, and the online Moroccan yellow pages. The idea was to verify how easy it would be for buyers who were aware of the GIEs to find more information about them through an internet search.
Have any GIEs defaulted on their loans from CAM?	As we note on page 37, 6 of the 10 GIEs who provided information on CAM repayments indicated that they were not up to date with their debt repayments. However, we are not aware of any that have defaulted entirely.
Was there any post-Compact engagement from GoM? Was this engagement officially planned or organized as part of the Compact or Compact closure or was it ad hoc/on demand engagement?	As mentioned earlier, USGAV (a GoM agency) has been providing ongoing technical assistance to the GIEs since the end of the Compact. For the first two years post-Compact UNOPS (the Catalyst Fund implementer) also provided technical assistance. Our understanding is that this was planned as part of Compact closure.
I don't see any analysis on the Cooperative/GIE model and its suitability for the application more broadly. While there are a lot of technical explanations for the many failures of the current GIEs, the report begs the question of whether any olive crushing operation organized in this way could possibly be successful, especially given the 80% subsidy received in this particular project, which should have made it substantially easier for GIEs to succeed financially.	<p>Given the high capital costs, it is difficult to imagine how these types of crushing units could be established without a large up-front external investment by other donors/the GoM/social investors. Similar investments in the future would be more likely to succeed if (1) the capital cost was fully paid for by donors/the GoM; (2) access to working capital was guaranteed; and (3) the GIEs received more intensive support in malmanagement and especially marketing. That said, all of this would not guarantee their success given inherent challenges with management, marketing, and financing in these new organizations.</p> <p>Some GIEs have generated modest profits despite some of the challenges they face, and were they not still in heavy debt to CAM these would have been returned to farmers as dividends (one measure of "success"). But it isn't clear from our findings how easy it would have been to identify these relatively more successful GIEs before making the investment.</p>

Comment	Evaluator Responses
<p>The report would be stronger if it did a better job of explaining that the GIEs' current financial problems are mostly a result of sales falling so far short of the original projections and not poor design. If sales were close to the original forecasts, serving the long-term loan to CAM and having more access to short-term capital would not pose the problems that they currently do. This is an example of the importance of focusing first on the market.</p>	<p>We agree with the importance of focusing on the market and that the disappointing sales results are a key factor behind the GIEs' financial problems. However, the original profit projections on which the design was based might have been overly optimistic/unrealistic given that the GIEs were new organizations with limited experience in management and marketing.</p>
<p>"Overall, GIE presidents largely view these loans as insufficient to account for their working capital needs and view the limited provision of working capital as a major flaw in the project design." As designed CAM was supposed to provide sufficient short-term capital for raw material purchases. In theory the plant and equipment paid for by the Catalyst Fund and other sources was to provide collateral for these loans. But CAM failed to deliver.</p>	<p>We have changed "project design" to "post-Compact project implementation".</p>
<p>"most of the GIE presidents that we interviewed reported being able to cover their operational costs." Is this statement assuming inclusive or exclusive of depreciation?</p>	<p>These were qualitative reports and were not based on financial statements. It seems likely that they did not account for depreciation, as respondents were discussing their ability to cover costs such as electricity and salaries from oil sales.</p>
<p>"GIE leaders had to be identified quickly," - by whom? The GIEs had to have functioning boards at the time they submitted their proposals to the Catalyst Fund.</p>	<p>We have clarified--GIE leaders were identified by the member cooperatives.</p>
<p>C. Olive purchases - The original design called for 3 payments to farmers: one upon sale of olives to the GIE, a second as the GIE sold olive oil, and a third in the form of a dividend after the GIE closed the books for the campaign.</p>	<p>We are not sure what the original design was, but stakeholders exclusively mentioned a two payment model. (It is unclear how payments could be made as the GIEs sold oil.)</p>
<p>"A related challenge is that many of the cooperatives that formed the GIE were new." I don't think this is correct. The FTTP worked with existing cooperatives in rain-fed areas and existing water users associations in irrigated areas. The entities that were new were the GIEs.</p>	<p>This is not our understanding based on the qualitative data, both for the GIE evaluation and the evaluation of irrigation activities in olive areas. We believe that some cooperatives already existed (although were not necessarily functional), but some did not (or they might have existed but were operating in different value chains).</p>
<p>Regarding sustainability, it is disappointing that interviewees did not mention increasing bulk sales, perhaps on a long-term supply agreement with a Spanish or Italian bottler, working through the GIE association (ANGIEO).</p>	<p>ANGIEO mentioned that they had shared the details of a Spanish bulk buyer with the GIEs, but this did not come up in the GIE president interviews.</p>
<p>There is no mention of Alafiya, the brand name under which the GIEs were going to market bottled olive oil. Is that now defunct?</p>	<p>Our understanding is that the brand is no longer active. Using the brand requires the GIEs' oil to be certified, and the GIEs received subsidies from the government for up to 2 years for the certification fees. Seven GIEs chose to take advantage of that subsidy, and the others did not. However, nowadays no GIEs pay the unsubsidized fee to get the Al Alfiya certification since they do not see the value from it. More generally, sales of branded oil in bottles have been very limited to date, as discussed in the report.</p>

Comment	Evaluator Responses
The methodology is stated as mixed methods. Can you be a bit more explicit about the identification strategy?	There was no identification strategy as such, since we were not estimating impacts. The mixed-methods evaluation included qualitative, descriptive quantitative, and olive oil testing components. We have clarified in the text.
Is it possible to put the logic on one page?	We have experimented with this in previous reports for this project, and this is the clearest presentation we were able to achieve without making the font too small.
are the assumptions in the program logic from MCC documentation or Mathematica? I wonder about the assumption of building private goods in the first place. Was this taken into account when the project was developed?	These assumptions are from MCC documentation.
Are "tasks" a technical term for olive oil storage or is this a typo? If it is a technical term, please define.	Corrected to "tanks".
What are the bars in the figure? Cooperatives? GIEs?	We have clarified in a figure note that each bar represents one GIE.
would be helpful to label the y axis as GIEs or note this in the title	We have clarified in a figure note that each bar represents one GIE.
when stating the currency in dirham, it would be helpful to also note the dollar value for context	Added to the text.
need to re-format the font in the main body	Corrected.
L'étude n'a pas mis le doigt sur les causes profondes des problèmes que connaissent les GIE. Sinon, comment expliquer que ces unités qui étaient subventionnées à 85% et qui opèrent dans un secteur très rentable, n'arrivent même pas à rembourser les crédits qui couvrent 15% de l'investissement.	Some of the root causes of the GIEs' limited profitability that are summarized in the report include challenges in terms of management, marketing, and cooperative engagement, as well as limited access to working capital.
Le projet s'est basé sur des hypothèses qui se révèlent non valides, à savoir que : (i) les gestionnaires des GIE sont des entrepreneurs qui gèrent ces unités pour le bien de la communauté des membres, (ii) qu'ils ont les capacités managériales nécessaires, (iii) la culture de coopération existent au sein de ces communautés, (iv) les outils de financement sont adaptés aussi bien pour le GIE que pour les membres. Le grand problème des GIE est que ces hypothèses ne sont pas valides. Il aurait fallu analyser les causes profondes des dysfonctionnement relevés afin de pour recommander des mesures appropriées que le Ministère pourrait adopter pour que ces unités retrouvent une situation saine.	This description of the reasons why most GIEs have fallen short of expectations is consistent with the evaluation findings, though we would also add the GIEs' limited ability to market their olive oil effectively. Although recommending specific follow-up interventions to address these challenges is beyond the scope of the evaluation, the report notes that the GIEs requested support in several areas, including the following: (1) hiring professional managers (possibly by diversifying their operations); (2) developing and implementing marketing plans with the help of marketing experts; and (3) finding more suitable mechanisms for working capital.

Comment	Evaluator Responses
<p>L'observation précédente est également valable pour l'évaluation ex-post relative au Catalyst fund et ce, par l'élaboration d'une typologie des GIE mis en place dans le cadre du projet en fonction des performances enregistrées par chacun d'eux, qui devait servir comme base d'analyse des stratégies développées par chaque type. Le but étant de dégager les déterminants de leur différenciation et des stratégies porteuses pour leur autonomisation. L'évaluation, a fait ressortir que le fond de roulement constitue un facteur de blocage pour la réussite du modèle, mais ne s'est pas étalée sur les autres sources d'un éventuel dysfonctionnement lié au dimensionnement des unités, au ciblage de la formation pour permettre aux bénéficiaires d'être en mesure de relever le défi de pratiquer en même temps le métier d'agriculteurs et de se charger de la valorisation et de la commercialisation et enfin l'articulation réellement vécue entre les deux niveaux des structures en place à savoir le premier niveau (coopératives) et celui de second ordre (GIEs).</p>	<p>In addition to the challenges the GIEs face with working capital, the evaluation identified challenges in terms of management, marketing, and cooperative engagement. As we note in the report, there is some variation in success across GIEs, especially in terms of whether the processing unit is functional and the amount of olives crushed. Based in the qualitative data we collected, the quality of leadership at the GIEs may be a key factor explaining the variation in success across GIEs, together with differences across geographic areas in the culture of cooperation among farmers. Overall, however, only a handful of GIEs operated at relatively high capacity and even these have struggled to sell the oil produced; the challenges that the evaluation identified are therefore generalizable to most of the GIEs.</p>
<p>Le présent rapport a complètement ignoré le rapport de l'évaluation finale du PAF réalisée en 2013 et n'a même pas pris la peine de le citer dans les références bibliographiques (voir rapport en pièce jointe). Ce dernier a porté sur la totalité des activités du PAF et regorge de constats et d'enseignements riches, fort intéressants et qui sont confortés par les résultats de l'évaluation ex-post. De même, le rapport de l'évaluation finale du PAF, bien que plusieurs effets et impacts attendus ou non attendus du PAF ne s'étaient pas complètement manifestés lors de la clôture du projet en 2013, a anticipé les risques encourus par le projet dans l'atteinte les résultats qui lui ont été assignés. Malheureusement, ces risques sont devenus une réalité et finalement l'évaluation ex-post ne fait que ressortir presque les mêmes constats et les mêmes enseignements que l'évaluation finale. L'évaluation ex-post se devait d'aller plus loin dans l'analyse et l'interprétation des résultats obtenus et répondre aux questions fondamentales suivantes : dans quelle mesure les recommandations de l'évaluation finale du projet ont été mises en œuvre ? quelles sont les contraintes ayant entravé leur concrétisation ? si elles ont été mises en œuvre, pourquoi elles n'ont pas donné les résultats escomptés ?</p>	<p>The end-of-Compact ME-16 report notes that it was too soon to assess whether the expected effects had been achieved. This is especially true for the Catalyst Fund, because the new units were largely not even operational yet; the ME-16 report focuses mainly on describing the establishment of the units. Assessing whether expected effects had been achieved was the goal of the ex-post evaluation, which largely finds that this was not the case and explores the reasons for this.</p>

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