



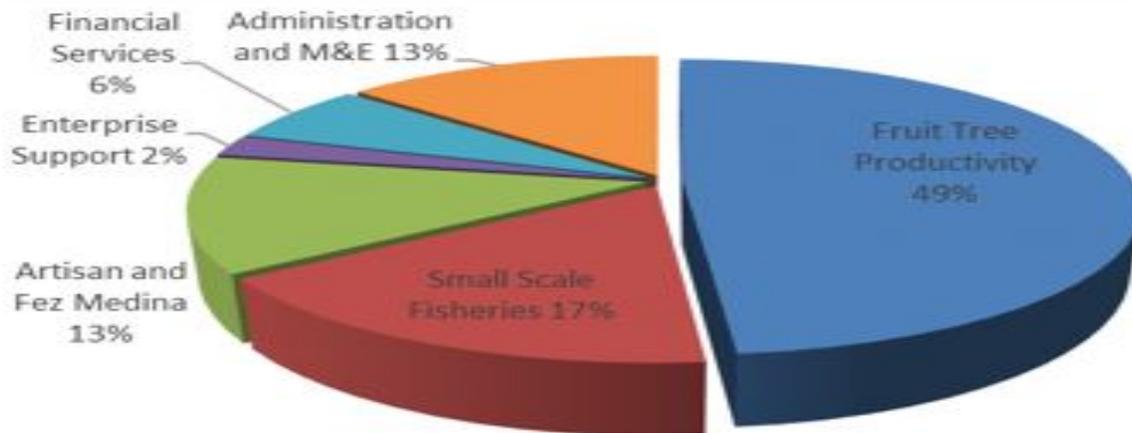
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Abstract

The \$323 million Fruit Tree Productivity (PAF) Project represented 49% of the total compact and consisted of five activities, four of which were covered in this evaluation, and aimed to reduce the volatility of agricultural production and increase the volume and value of tree crops to promote economic growth in the agricultural sector and reduce poverty in the country. Accounting for the nature of the PAF intervention, the expected impacts had not yet all been generated at project closure, as it was too early for any impacts on agricultural revenue and household incomes to have accrued. Nonetheless, the evaluation does reveal some positive and encouraging assessments from beneficiaries, although the evaluation results were heavily impacted by the unfavorable weather conditions of 2013. The *Rain-fed Olive, Almond, and Fig Tree Intensification and Expansion Activity* consisted of two sub-activities that were the subjects of two separate evaluations, as well as this more broad evaluation of the project as a whole. Preliminary results show that the Expansion sub-activity had positive outcomes on direct job creation for local populations in the target areas, and the Rehabilitation sub-activity had led to slight increases in olive production and revenues in the treatment areas. The results of the *Olive Tree Irrigation and Intensification in PMH Areas Activity* show that about half of the farmers reported that the project made a satisfactory contribution to meeting their needs, despite the estimated average gross margin for the entire sample amounting to even less than that of the baseline. As for the *Date Tree Irrigation and Intensification in Oasis Areas Activity*, the average gross farm income per farm in the oasis area was estimated to have increased by 7% compared to the baseline, but remained 13% lower than the end of the Compact target. About half of date tree growers surveyed expressed satisfaction with the project's contribution to the needs of their household although impacts on date tree productivity in oasis areas were unclear due to the unfavorable weather conditions of 2013, having achieved an average productivity of even less than the baseline. Although the interventions of the Fruit Tree Productivity Project failed to achieve all of the expected results, they most likely mitigated the negative effects of the adverse weather conditions of crop year 2012-2013.

Measuring Results of the Morocco Fruit Tree Productivity Project

In Context



The MCC compact with Morocco was a five-year investment (2008-2013) of \$649.4 million in five projects: Fruit Tree Productivity (PAF, per its acronym in French), Small Scale Fisheries, Artisan and Fez Medina, Financial Services, and Enterprise Support.

The \$323 million PAF Project represented 49% of the total compact and operated through five activities: (i) Rain-fed Olive, Almond, and Fig Tree Intensification and Expansion, (ii) Olive Tree Irrigation and Intensification in PMH zones, (iii) Date Tree Irrigation and Intensification in the Oasis, (iv) Fruit Tree Sector Services, (v) the creation of new modern crushing units supported by a dedicated fund (Catalyst Fund).

This paper summarizes the results of the performance evaluation of the Fruit Tree Productivity Project, and its corresponding activities.

Program Logic

The Fruit Tree Productivity Project (PAF) aimed to reduce the volatility of agricultural production and increase the volume and value of tree crops to promote economic growth in the agricultural sector and reduce poverty in the country. The selected strategic option was based on the transition from annual extensive crops – notably cereals – to market-oriented perennial tree crops (olives, almonds, figs, dates). The goal was to improve productivity and strengthen value chain segments, meanwhile ensuring the protection of the environment and well-being of the beneficiaries, notably the farmers in the zones targeted by the project.

Figure 1. Program Logic for the Fruit Tree Productivity Project (PAF)

Inputs	Outputs	Immediate Effects	Intermediate Effects
MCC funded studies and activities for planting and irrigation improvements, and support services for the olive, almond, fig, and date palm value chain operators	<ul style="list-style-type: none"> • The planted and maintained area is transferred to the beneficiaries in the rain-fed areas • Area developed in irrigated zones (PMH and oasis) • Date palm areas maintained and densified • Value chain operators of the targeted sectors are trained and supervised • The processing units are built and equipped 	<ul style="list-style-type: none"> • High value fruit trees are extended, rehabilitated, and diversified. • Good practices for technical conduct of fruit trees, manufacturing, health, and management have been adopted • The processing units installed by the project are operational 	<ul style="list-style-type: none"> • The productivity of the targeted species is effectively increased • Product quality is improved • The value of the tree crops is increased

There were several key assumptions underlying the project logic during the design of the investment:

- Farmers and other stakeholders of the value chain targeted by the project have access to financing to apply the techniques and business plan recommended/designed by the project;
- Farmers' organizations, including cooperatives and associations, will take over the newly planted trees, the new irrigation infrastructure, olive crushing units, after the project. They have the management and technical skills to continue to operate all the equipment and the infrastructure put in place by the project;
- A coordination framework exists between the different operators in the value chains for the processing of these products according to a standard quality or superior quality system
- The domestic olive oil market offers opportunities for the high quality additional olive oil produced as a result of project activities.

Measuring Results

MCC uses multiple sources to measure results. Monitoring data is used during compact implementation. Independent evaluations are generally completed post-compact. Monitoring data is typically generated by the program implementers, and specifically covers the program participants who received treatment through the compact. MCC conducts performance evaluations to assess whether the program was adequately designed to meet the needs of the program beneficiaries and how the program was implemented. MCC Performance evaluations assess the program activities according to the following criteria: coherence, efficiency, effectiveness, applicability, and durability.

Monitoring Results

The following table summarizes the performance of specific indicators for outputs of the project. All cited data is as of the Compact's final Indicator Tracking Table (September 2013).

Indicators		Level	Actual	Target	Percent Complete
Activity 1: Extension and intensification of olive, almond, and fig plantations in rain-fed areas					
• Area planted with olive and almond trees (ha)	Output	60,084	60,372	100%	
• Area transferred to the beneficiaries (ha)	Output	38,185	60,372	63%	
• Area treated with CES measures (ha)	Output	33,038	41,901	79%	

Activity 2: Irrigation and intensification of olive trees in PMH areas					
• Area under improved PMH irrigation (ha)	Output	33,983	33,983	100%	
Activity 3: Irrigation and intensification of date palms in oasis areas					
• Area under improved irrigation (ha)	Output	19,393	19,393	100%	
• Number of in-vitro seedlings distributed	Output	250,967	250,000	100%	
• Number of palm trees cleared of undergrowth and offshoots	Output	170,000	140,000	121%	
Activity 4 : Support Services for Trees Sectors					
• Number of new cold storage and date packaging units installed	Output	7	7	100%	
• Number of farmers trained	Output	40,863	42,000	97%	

• Number of youth farmers trained	Output	15,476	7,500	206%
• Number of members of the OPA trained	Output	4,172	2,800	145%
• Number of olive and date processing units that have benefited from technical assistance	Output	114	114	100%
• Number of pilot projects for women's organizations that are receiving support	Output	14	14	100%
Activity 5: Catalyst Fund				
• Number of crushing units built and equipped	Output	12	20	60%

• Number of operational processing units funded by Catalyst Fund	Output	8	20	40%
• Number of Catalyst Fund proposals approved	Output	20	20	100%

The average completion rate for these outputs is 101%; and the target values were met or exceeded for 11 out of 16 indicators.

Evaluation Questions

The principal questions are formulated as follows:

- To what extent have the design, implementation and operations of the PAF responded to the need of beneficiaries?
- To what extent have the organizational, managerial, partnership, and monitoring methods achieved the objectives assigned to the activities of the PAF?
- To what extent has reprogramming and adjusting PAF implementation (mid-term evaluation) generated the expected results?
- To what extent have the effects and impacts actually generated by PAF efforts been felt, viable, and sustainable beyond the end of the project?
- To what extent are the achievements, best practices, and successful initiatives of beneficiaries and the professional organizations to which they belong reproducible and generalizable?

Evaluation Results

Accounting for the nature of the PAF intervention, which centered on the cultivation of fruit trees, the

expected impacts had not yet all been generated at project closure, due mostly to the short duration of the assessment. It is also still early for any impacts on agricultural revenue and household incomes, but results show variable trends by sector and area. Nonetheless, the evaluation does reveal positive and encouraging assessments from beneficiaries.

Rain-fed Expansion and Intensification Activity

Effects and impacts of the rehabilitation activities at the level of beneficiaries and non-beneficiaries were heavily subject to and dominated by weather conditions, especially the unfavorable weather conditions of 2013. As a result, the causal relationships between “training, technical support and mentoring services” and “adoption of improved technical practices for production” had not materialized into stable and significant productivity, revenue and income gains among the beneficiary farmers.

One of the most important immediate positive outcomes of the “Expansion” sub-activity for local populations in the target areas has been direct job creation. Given the number of planted hectares, approximately 75,000 hectares, this sub-activity would have created approximately 6 million days of direct work. At a minimum level of maintenance, or an average of 15 man-days/ha, the planting areas could generate between 4,000 and 5,000 direct jobs annually. Other positive impacts include protecting soils against erosion and retaining storm water, shaping natural landscapes and the attractiveness of local tourism, establishing a structure for producers and a web of associations and local cooperatives, securing land rights and developing fringe lands, and strengthening and diversifying local productive capacity. However, some risks of negative externalities have also been identified, including increased pressures on water resources, probable decline in pastoral livestock revenue, and weak social cohesion in the planting areas (conflicts between livestock farmers and fruit farmers).

Pertaining to the “Rehabilitation” sub-activity, the data from the monitoring of cultivation operations among the beneficiary farmers showed mixed trends, albeit with positive developments in some of the techniques put forward in the training sessions. The techniques that saw adoption rates increase slightly between 2011 and 2013 are those of tilling, pruning in general, pruning of adult trees in particular, and harvest operations, notably the use of mechanical harvesting, the use of vibrators or also tarp. The impacts were not significant overall—the main reason being the duration of the assessment, which suggests that it will take some time before farmers perceive the usefulness and interest of the recommended techniques, in particular their impact on productivity and production volumes. However, olive production was higher in the treatment areas by 12% in 2011, 4.1% in 2012 and 7.2% in 2013, as were olive revenues by 5.1% in 2011, 5.5% in 2012 and only 1.5% in 2013. While these results may be interpreted as a positive impact attributable to the project, revenue between 2012 and 2013 did not maintain this trend, and consequently the overall goal of increasing revenue from olive production by 29.8% over a three-year period was not achieved. These results confirm the high vulnerability of production, income, and net revenue from olives

to climate in rain-fed areas.

Olive Tree Irrigation and Intensification in PMH Areas Activity

Despite only 2.66 T/ha of the targeted 5T/ha of orchards in PMH areas having been rehabilitated by 2012-2013, about 1/3 of the entire sample surveyed (half in oasis areas) believe they had improved their technical practices for olive trees. This proportion increases with the farm size: 27.1% at small farms, 36.3% at medium-sized farms, and 41.1% at large farms. Nearly 40 to 60% of farmers in PMH areas reported that the project made a satisfactory contribution to meeting their needs, nearly 30 to 40% of them reported an increase in farm income, and a quarter to a third of them reported an improvement to their standard of living. Based on production in crop year 2008/2009, the baseline had estimated the average income per farm in PMH areas at the equivalent of US \$ 4,784. According to the project's forecasts, average farm income was expected to reach the equivalent of US \$ 5,143 at the end of the Compact, representing a 7.5% increase. The evaluation was unable to measure the overall net income of the project's beneficiary farmers, but according to the survey results, the average gross margin for the entire sample was estimated at nearly MAD 35,000 per farm, or the equivalent of US \$ 4,175. Not only is this figure well below the income level expected by the end of the compact, but it is also lower than that of the baseline. As previously discussed, the disparities recorded in gross agricultural income are to a large extent due to the adverse weather conditions in crop year 2012/2013 on which the final evaluation survey was focused, compared to an excellent crop year during the baseline (2008/2009).

Date Tree Irrigation and Intensification in Oasis Areas Activity

Impacts on date tree productivity in oasis area were modest, only having achieved an average productivity of 28.8 Kg/tree in comparison to the target of 51 Kg/tree. Compared to the baseline of 36.3 Kg/tree, the yield actually went down. The difference between the yield at baseline and the yield in the final project evaluation is attributable to the adverse weather conditions during crop year 2012/2013 and poor adoption of new practices by farmers. Although the project's interventions failed to reach the expected yield, they most likely mitigated the negative effect of the adverse weather conditions of crop year 2012/2013. Without them, the yield would have been lower, as would the proportion of satisfied date tree growers (45%). Nearly 50 to 60% of date tree growers surveyed expressed satisfaction with the project's contribution to the needs of their households. Likewise, nearly 30 to 40% of date tree growers believed their farm income, standard of living, and agricultural employment of household members had improved as a result of the project. According to the 41.4% of surveyed beneficiaries, the project had observable effects on date tree yields, reported by 36.1% of small farms, 51.0% of medium-sized farms and 38.0% of large farms. At a rate evenly distributed across farm size, farmers also reported that the quality of their date production had also improved since the beginning of the project. When asked about their overall assessment of the developments in their technical practices on date trees, nearly 51% of all farmers surveyed feel that they have improved with the advent of the project (42.2% of small farms, 57.0% of medium-sized farms and 50.5% of large farms) – a considerably more positive assessment than that

collected from the farmers surveyed in PMH areas (33%). The average gross farm income per farm in the oasis area was estimated at the equivalent of US \$ 5,057, corresponding to a 7% increase in income compared to the estimated baseline (US \$ 4,740), but remaining 13% lower than the end of the Compact target value (US \$ 5,830).

The entire project also had a positive impact on farmers' individual and collective capacity building through training, mentoring and technical support. The sector approach and self-aggregation process fostered better social and economic integration for traditionally marginalized groups. Particularly, the gender-conscious approach and female pilot projects (PPF) helped to improve the social and economic status of women, as they are now more involved in new local development dynamics, representing more than 10% of the members of the groups set up as part of the project. Conversely, the situation of young people has not shown such improvement due to the lack of specifically targeted approaches and economic integration.

Evaluator	National Opinion Research Center
Methodology	<i>Pre-post</i> approach
Evaluation Period	From May 15 to November 14, 2013

**Intermediary
Effects***Rain-fed Expansion and Intensification Activity*

- Job creation: 4,000 and 5,000 direct jobs annually
- Adoption rates of new techniques: increased slightly between 2011 and 2013 for tilling, pruning, mechanical harvesting, the use of vibrators and tarp
- Olive production: increased by 12% in 2011, 4.1% in 2012 and 7.2% in 2013
- Olive revenues: increased by 5.1% in 2011, 5.5% in 2012 and 1.5% in 2013

Olive Tree Irrigation and Intensification in PMH Areas Activity

- Farmer Perceptions:
 - About 1/3 believe they had improved their technical practices for olive trees
 - Nearly 40 to 60% of farmers in PMH areas reported that the project made a satisfactory contribution to meeting their needs
 - Nearly 30 to 40% of them reported an increase in farm income,

Date Tree Irrigation and Intensification in Oasis Areas Activity

- Date palm yields in the oasis: declined from 36.3 Kg/tree at baseline to 28.8 Kg/tee
 - Farmer perceptions:
 - Nearly 50 to 60% of date tree growers surveyed expressed satisfaction with the project's contribution to the needs of their households
 - Nearly 30 to 40% of date tree growers believed their farm income, standard of living, and agricultural employment of household members had improved
 - 41.4% of surveyed beneficiaries believed the project had observable effects on date tree yields
 - Nearly 51% of all farmers surveyed feel that they have improved their

	techniques
Final Impact	<p><i>Rain-fed Expansion and Intensification Activity</i></p> <p>–Olive revenues: previous gains disappeared by crop year 2012/2013</p> <p><i>Olive Tree Irrigation and Intensification in PMH Areas Activity</i></p> <p>– Average gross farm income in PMH areas: declined by 13% (likely due to adverse weather conditions in crop year 2012/2013)</p> <p><i>Date Tree Irrigation and Intensification in Oasis Areas Activity</i></p> <p>-Average gross farm income in the oasis: 7% increase</p>

Lessons Learned

- **Management of stakeholders’ social conflicts to secure productive capital:** The social sustainability of the planting projects will depend on the arrangements and compromises of the stakeholders that were implemented during and after the close-out of the Activity and/or under accompanying measures related to the Green Morocco Plan.
- **Consolidation of the operational autonomy of professional organizations:** Very particular attention should be given to technical and financial support of the established OPA to establish and consolidate their representativeness, and redefine their roles and missions to better engage public interest on the perimeters transferred to the beneficiaries.
- **Capacity Building:** The capacity building of the WUAs and their actual implication both in terms of their design, the improvements made in management, and the ability to carry out the project is a critical factor in establishing the project’s sustainability.
- **Organizational model and technological processes:** Proposed solutions must be tailored and adapted to the contexts of the areas where they are implemented. In line with its integrated approach aimed at strengthening the vertical linkages along the value chains of the targeted sectors, the PAF opted for a model of self-aggregation of the growers and the date palms of the areas of intervention around, respectively, the olive processing units (UT), and the dates packaging units (UC), governed by economic interest groups (GIE) formed from cooperative groups of the different targeted areas.
- **Intervention strategy:** For more successful intervention in post-production, it is as important to integrate the processing of raw agricultural materials as it is to integrate other dimensions, including those related to logistics in terms of road infrastructure, the means of transportation and distribution infrastructures. The said dimensions fall within the fields of expertise of ministry

departments other than agriculture. At the territorial level, the inclusion of these dimensions call in a key essential stakeholder. These are local communities, including rural communities that despite the responsibility they were entrusted with, with regards to local development, they were only marginally involved in the implementation of PAF interventions in their territories.

Next Steps

MCC is pursuing a continued independent evaluation of various activities within the Fruit Tree Productivity Project, which will be carried out by Mathematica Policy Research. This follow-on evaluation will further explore the randomized impact evaluation of the Rain-fed Olive Rehabilitation activity and the performance evaluation of the Project's Irrigation, Support, and Catalyst Fund activities. Continued evaluation of these activities will give an opportunity to measure those impacts which may have accrued after the Compact's end date in late 2013.