



Exporting Quality and Safety (EQS) Program

*A program focused on the fruits and vegetables sector
of the Dominican Republic*

Programa Exportando Calidad e Inocuidad (ECI)

*Un programa dirigido al sector de frutas y vegetales
de la República Dominicana*

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Baseline Study

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List of Acronyms

APHIS	Animal and Plant Health Inspection Service
CATIE	Centro Agronómico Tropical de Investigación y Enseñanza
CEDAF	Centro para el Desarrollo Agropecuario y Forestal
CONACADO	Confederación Nacional de Cacaocultores Dominicanos
DR	Dominican Republic
DCoP	Deputy Chief of Party
EU	European Union
EQS	Exporting Quality and Safety
FAMU	Florida Agricultural and Mechanical University
FFPr	Food for Progress
GAP	Global GAP (Good Agricultural Practice)
GoDR	Government of the Dominican Republic
HACCP	Hazard Analysis Critical Control Point
IESC	International Executive Service Corps
Medfly	Mediterranean fruit fly
MinAg	Ministry of Agriculture of the Dominican Republic
MinICom	Ministry of Industry and Commerce of the Dominican Republic
MEPyD	Ministry of Economics, Planning and Development
MoEnv	Ministry of Environment and Natural Resources
M&E	Monitoring and Evaluation
OCI	Organizational Capacity Index
PMP	Performance management plan
SPS	Sanitary Phytosanitary
UNDP	United Nations Development Program
USDA	United States Department of Agriculture
USG	United States Government
WB	World Bank
WFLO	World Food Logistics Organization

Executive Summary

The baseline study for the EQS program was carried out during the months of November and December 2015 with the scope of establishing baseline value for the USDA-funded 4-year EQS program. The study encompassed various activities including desk review of technical documents and statistics; interview with producers, association and cluster management, technicians, sector experts; direct market observations; and, field visits. The study was executed taking in consideration the program’s terms of reference as well as the performance indicators of the EQS performance monitoring plan. The completed study fulfills agreement requirements found on page six under Item II – Reports and Document Submission, Section F, Baseline Study.

In the Dominican Republic, the fruit and vegetable industry operates in a deregulated environment, where market forces of demand and supply determine prices of commodities. The five target commodities represent more than a fifth of the agricultural crop value, with cocoa beans being the most significant produce (9 percent of crop value and 6 percent of agro-GDP) followed by avocados (6 percent of crop value), pineapples (5percent), greenhouse produce (1 percent) and oriental vegetables (0.3 percent). These products also contribute significantly to the commercial balance of the country, representing some 15.4 percent of agro-food export value, with cocoa beans accounting for an 11 percent share, greenhouse produce for 2.5 percent, avocados for 1.2 per cent, oriental vegetables for 0.6 percent and pineapple for 0.2 percent.

There is no available and reliable information of actual sales through formal market channels, though it is known that the magnitude of informal market in the Dominican Republic is very significant. To overcome this difficulty, it has been assumed that formal sales equal five percent of the production volume plus the export quantities. These sales volume have then been valued at respectively the wholesale price (calculated as twice the farm gate price, for which statistic figures do exist) and export price. For cocoa beans, domestic sales only represent 1 percent of output (98 percent being exported). Both domestic and export data are for 2014. Below are the summary values for the target commodities.

Table 1: Value Chain for Target Commodities	Production 2014			Exports 2014		
	MT	000 US\$	US\$/MT	MT	000 US\$	US\$/MT
	Avocados	428,301	131,519	307	19,272	22,530
Pineapples	346,275	101,966	294	4,845	3,690	762
Greenhouse produce	57,980	20,281	350	38,494	49,245	1,279
Oriental vegetables	19,439	6,949	357	14,446	11,311	783
Cocoa beans	69,633	188,434	2,706	68,196	212,116	3,110
Total 5 (groups of) commodities	921,628	449,149	487	145,253	298,892	2,058

Targeted direct beneficiaries are estimated at 8,000, the large majority of which are producers (6,100)¹. In addition, direct beneficiaries include some 1,800 packinghouse staff, and several exporters, processors, and their staff. Below is the estimated baseline value for the five target commodities. The baseline values include the estimated domestic formal sales and exports of the producers that are direct beneficiaries of the program.

¹Actual number of producers that will benefit directly is estimated at roughly 3,000, see below. They account for about 5 percent of the some 61,500 producers growing these 5 commodities in the Dominican Republic.

Table 2A: Baseline Value for 5 Commodities	Baseline (Formal) Domestic Sales 2014		Baseline Exports 2014		Baseline Exports (ban 2+ years)	
	Tons	000 US\$	tons	000 US\$	tons	000 US\$
	Avocados	4,283	2,630	7,709	9,012	2,390
Pineapples	6,926	4,079	3,149	2,399	3,149	2,399
Greenhouse produce	580	406	7,699	9,849	3,201	4,721
Oriental Vegetables	486	347	8,668	6,786	8,668	6,786
Cocoa beans	279	754	2,728	8,485	2,728	8,485
Total 5 (groups of) commodities	12,553	8,216	29,952	36,531	20,135	25,545

Due to the significance of the U.S. ban for imports of avocados and peppers from the Dominican Republic because of Medfly infestation that was in effect from March 2014 to January 2016 (lifted only in 23 provinces) an alternative scenario baseline has been developed to take into consideration the drastic reduction of these exports to the U.S. in case the ban continues for at least 24 months. Below is the baseline value for total sales (domestic and exports) as well as the alternative scenario baseline value.

Table 2B: Baseline Value for 5 Commodities	Baseline Total Sales		Baseline Total Sales (scenario: ban 24+ months)	
	MT	000 US\$	MT	000 US\$
	Avocados	11,992	11,642	6,673
Pineapples	10,075	6,477	10,075	6,477
Greenhouse produce	8,279	10,255	3,781	5,127
Oriental vegetables	9,154	7,134	9,154	7,134
Cocoa beans	3,006	9,238	3,006	9,238
Total 5 (groups of) commodities	42,505	44,747	32,688	33,761

Twelve problem points have been identified through interviews with producers, technicians, cluster and association management, and executive directors. The identified problem points include: certifications for Global Gap and Organic produce; water conservation; delay in the transfer of technical know-how; failure of obtaining quick results from analysis of pesticide residues; shortage of reliable export outlets; delay in the introduction of processing technologies; insufficient orchard renovation; delay in fabricating alternative raw or semi-processed cocoa based produce for the local market.

As for the Organizational Capacity Index (OCI), the results show high average scores (average is 80 out of 100), an outcome not so surprising when considering that the selected four clusters are somewhat established associations that have benefitted from years of technical and financial assistance from donors, both national and foreign. These associations have also an unusual (for the sector) participation of women in management and/or executive roles. Moreover, all of them also receive technical expertise and advice from agronomists that are employees of the Ministry of Agriculture, therefore, benefitting at no extra cost for the members of an activity (field technical assistance) for which the OCI tool provides as many as 18 points (or 18 percent of total).

Table 3: OCI Score for Five Clusters, as a percent share of maximum score

	Maximum score	Avocado Cluster Cambita	Pineapple Cluster Cevicos	Greenhouse Cluster Jarabacoa	Oriental Vegetables Cluster La Vega	Cocoa Beans CONACADO Cutui	Average
Total OCI Score	100	91%	72%	66%	77%	93%	80%

In terms of gender considerations, women participation in the five target value chains is small in percent but they seem very active and more commercial-oriented than average farmers do. Several of them have significant roles either as owner or as association executive in all the target chains and particularly strong in the processing of cocoa beans and their commercialization. In addition, women account for a significant percent share of packinghouse employees. A few women-only associations are active in the processing of cocoa beans.

Gender related aspects have no relevant roles in identified problem point issues, except for problem point 12, where women cocoa processing associations would be the natural targets of the program supports. Finally, the presence of female management and/or executives in the producer groups selected for the OCI processes have generally positively affected the scoring points of the tested organizations.

I. Introduction

The Exporting Quality and Safety (EQS) program is a four-year effort funded by the USDA Foreign Agriculture Service through Food for Progress. IESC is the lead implementer of this program, joined by local Dominican partner *Centro para Desarrollo Agropecuario y Forestal* (CEDAF), Florida Agricultural and Mechanical University (FAMU), and the World Food Logistics Organization (WFLO). The program aims at increasing productivity and sales for domestic and export markets of high-value fruit and vegetable global value chains, specifically: avocado, cocoa, pineapple, and greenhouse and oriental vegetables. The program also aims at improving product quality, increasing production efficiency, increasing the value of post-harvest products, and improving marketing and market linkages.

The program takes a “field to fork” approach, providing technical assistance all along the value chain, including producers, packinghouses, and exporters. The program’s capacity building activities, which include training on improved technologies and farm, land, and water resource management, will help producer groups, cooperatives, and their members meet international standards for safety, quality, and labeling. Since most DR horticulture value chains rely on a high degree of product aggregation from multiple small sources with minimal controls and accountability, the program will use a combination of expanded traceability systems; strengthened producer groups, cooperatives, and trade associations; and intense farmer training to ensure that food products being exported are grown, harvested, and handled under accountable sanitary conditions. Strengthened value chain governance is paramount and should be the result.

The program is organized under the following five activity areas:

1. Capacity Building: Producer Groups and Cooperatives;
2. Capacity Building: Trade Associations;
3. Cold Chain Improvement;
4. In-kind Grants: Equipment; and,
5. Public Information Campaign: Disperse Improved Market Information

A. Scope of Baseline Study

The baseline study accomplished the following tasks:

- Verified estimated baseline values for value and volume of sales of five target commodities using desk review, interviews, and direct observation.
- Analyzed applicable export sources related to these five target commodities;
- Collected data and establishing baseline for how long it takes specific products to get through targeted problem points in the value chain using interviews, direct observation, and focus groups (as needed);
- Provided return on investment thresholds and adaptable models as part of the analytics related to product expansion (e.g. technology, productivity, or value-added enhancements as related to possible costs and production capacity);
- Performed the organizational capacity index (OCI) process to establish a baseline score for each of five target/pilot producer groups. This includes conducting a survey of producer group senior management and participatory exercises involving producer group representatives and their members;
- Produced thorough documentation for each data collection method used to ensure the same could be applied throughout the program (data reliability).

The study produced the following deliverables:

- A baseline study report that includes proposed baseline values for four program indicators and any applicable disaggregation, a detailed description of the entire data collection process (methodologies and tools), and lessons learned/key things to monitor going forward.
- Written transcripts of all focus group discussions conducted.
- Raw data of each OCI process in excel format.
- An analysis report on applicable export data sources related to the five target value chains.
- An analysis report summarizing suggested ROI thresholds and adaptable models related to measurement of product expansion.

B. Overall Methodology and Strategy

Methodology used in collecting and verifying data to establish baseline volume and value of sales of five target commodities.

To determine the baseline volume of sales of the five (groups of) commodities by direct project beneficiaries official statistical data provided by the *Oficina Nacional de Estadística* (ONE) (<http://www.one.gob.do/#>) on 2014 production were used for estimating the volume of formal domestic sales by assuming that just a 5 percent share of total production was sold through formal distributional channels. Data provided by the ITC Trade Map web site (<http://www.trademap.org/>) were used for establishing the volume of exported produce in 2014. Cocoa is mostly exported; therefore, the volume of domestic sales for cocoa was estimated at 1 percent of output.

To determine the baseline value of sales of the five (groups of) commodities by direct project beneficiaries, official statistical data provided by the national statistics office (ONE) on 2014 farm gate prices were used for estimating baseline sales price, by assuming the domestic wholesale price as twice the production (farm gate) price. Data provided by the ITC Trade Map web site was used for establishing the value of exported produce in 2014.

The baseline study has to determine the baseline value for result indicators #7 and #8 of the EQS program that define respectively the US\$ value and gross metric tons (MT) of sales of the five (groups of) commodities by all project beneficiaries. This includes all sales by direct project beneficiaries, including farm-gate sales, wholesale sales and exports. The estimated number of direct beneficiaries of the program activities is in Result Indicator #1 and totals 8,000, including producers, packinghouse staff and exporters. The number of packinghouse staff (direct beneficiaries) are in Activity Indicator #1.4 (1,800 individuals) while the number of processors and exporters benefitting from program activities are respectively in Activity Indicator #1.3 (74 individuals) and Result Indicator # 14 (20 individuals). Hence, the number of producers that are direct beneficiary of the program activity has been calculated as 6,100 (i.e. the rounded balance between 8,000 and 1,894).

Therefore, the targeted direct beneficiaries of the EQS program total 8,000 individuals, of which about 6,100 are producers of the five commodities (the rest being packinghouses staff, exporters, and processors). Each individual direct beneficiary is to be counted once per reporting year (according to USDA rules for this indicator). For example, if a farmer receives training in Y1 and then the same farmer receives technical assistance in Y2 and Y3, that would be a total of three direct beneficiaries (instead of just one). Therefore there will be between 1,525 and 6,100 direct beneficiary producers over the 4-years and the median number of 3,000 producers has been assumed as reference. These producers were evenly allocated to each commodity chain (700 producers

per commodity chain) except for pineapples and oriental vegetables (respectively just 400 and 500 producers) due to the limited number of trade-oriented growers (roughly 628 and 900 respectively in 2014).

Table 4: Estimated Number of Trade-Oriented Producers in the DR for Target Commodities, Direct Beneficiaries and Baseline Values

	Total Farmers	Trade-Oriented Farmers	Direct Beneficiary Farmers	Direct Beneficiaries as % of Trade-Oriented Producers	Baseline Value as % of Domestic Sales	Baseline Value as % of Exports
Avocados	15,000	2,000	700	35%	20%	40%
Pineapples	700	628	400	64%	40%	65%
Greenhouses	4,800	3,500	700	20%	20%	20%
Oriental vegetables	5,000	900	500	56%	50%	60%
Cocoa	36,000	4,000	700	18%	4%	4%
Total target commodities	61,500	11,028	3,000	27%		

The significance of these targeted producers on the total number of active, trade-oriented growers for each commodity chain was then used in estimating the actual baseline for both volume and value. A further adjustment was made to take in consideration that the selected producers are likely to export a more significant share of their production when compared with the average farmers. For instance, since the 700 targeted avocado producers represent roughly less than 5 percent of the estimated total number of avocado growers in the Dominican Republic, but more than one-third of the trade-oriented farmers, the baseline volume and value has been estimated as the sum of the following: i) 40 percent of the export volume and value – assuming that the beneficiary producers are more likely to export than average farmers; and, ii) 20 percent of the formal (i.e. invoiced) domestic sales -being the latter estimated as 5 percent of the production volume and wholesale-level value- hence just 1 percent of output. The commodity specific adjustments are described in the relevant parts of the study.

The total number of producers and that of trade-oriented farmers for each commodity chain has been estimated on the basis of available, published information, reports and news available on the web, interviews with clusters representatives, association members, technicians, and validated against official statistics on planted areas provided by ONE and MinAg.

An alternative scenario baseline has also been established to take in consideration the effect of the ban of export to the U.S. markets for avocados and peppers grown in the Dominican Republic due to Medfly infestation revealed in March 2014. The scenario baseline should apply in case the import ban lasts 24 months or more and has been established on the basis of available (mirror) data on DR exports of the ban-affected produce for the second and third quarter of 2015. The export ban was repealed on January 7, 2016 only for produce originating from 23 provinces.

A list of assumptions made in the drafting of this baseline study is in Annex 2.

Methodology to establish baseline for how long it takes specific products to get through targeted problem points in the value chain.

The relevant information on problem points for each commodity was obtained through direct interviews with producers as well as cluster and association management during focus group gatherings and ad-hoc meetings

for undertaking the OCI process. Such information was then validated and tested against interviews with sector specialists, direct observations, and a critical review of technical papers and information available on the web.

Methodology to establish average baseline organizational capacity score (OCI) of target producer groups.

An OCI questionnaire was prepared using available information provided by the program (the original OCI manual was prepared by a USAID-funded program carried out in Colombia several years ago) and adapted to the Dominican situation. A scoring table was also prepared to transform provided information on organizational capacity in standards points to compare the organizational capacity of different associations. Five OCI questionnaires were completed through direct interviews with clusters/associations management.

II. Baseline Data

A. Value and Volume of Sales (Result Indicators 7 and 8. FFPi Indicators 13 and 14)

The Result Indicators 7 and 8 of the EQS program will collect respectively the US\$ value and gross metric tons (MT) of sales of the five (groups of) commodities by all project beneficiaries. This includes all sales by direct project beneficiaries, not just farm-gate sales. The actual number reported for the indicators will be respectively the value of sales and the gross volume of the produce marketed by the direct project beneficiaries in the baseline period (2014) and subsequent reporting periods. For the latter, only sales attributable to USDA investment count. An increase in sales of the produce would be directly related to increasing agricultural productivity and expanding trade. A rise in the volume of sales at farm- and enterprise-level of the targeted commodities is a measure of improved competitiveness of those producers and associations receiving program assistance. In addition, it helps tracking supply, access to markets, and progress toward commercialization.

Since the annual output of agricultural produce is subject to variation of climatic conditions, there is a need to identify an indicator that is as much as objective as possible, though the effect of climatic variability cannot be completely eliminated. This is particularly true for the cultivation of plantation such as avocados, pineapple, and cocoa as well as for open field growing of oriental vegetables, while greenhouse produce is less affected by the weather. Also, when supply is plentiful (scarce) domestic prices tend to decline (rise) affecting the value of production for a given year. Export flows are also influenced by the variances of output but their performances (both for value and volume) are more objectively determined. In addition, because of the magnitude of the informal market in the DR, a significant share of farmers' domestic sales are difficult to report through invoices or similar accounting means, hence difficult to verify. On the contrary, exports and sales to restaurants, hotels, convenience stores, and supermarkets are more easily formally verified.

Therefore, preferred baseline assessment for both volume and value of direct beneficiaries of the program activities should include exports, packaged produce (most of which, however, is actually exported), and any sort of formal marketing and sales activities rather than (less reliable) production data reported by the national statistical office ONE or by the Ministry of Agriculture and its agencies. As for the baseline study, the volume of formal domestic sales was estimated by assuming that a five percent share of total production was sold through formal distributional channels; however, for cocoa, that is mostly exported, the volume of domestic sales was estimated at just one percent of output. The value of domestic sales was then estimated by applying to the above volume an average reference sale price for each commodity that equals the domestic wholesale price estimated as twice the production (farm gate) price.

The number of farmers involved in the production of the target commodities has been estimated at 61,500, while planted area amount is at almost 170,000 ha. There is no updated official information on number of

producer per commodity. The MinAg has updated data on number of greenhouse producers but we were unable to obtain it, except for the Jarabacoa cluster. For Pineapples, the Cevicos cluster provided data of 628 active producers, though the number of actual producers might be significantly higher because there are many micro producers producing very small plots (total pineapple growers have been estimated at 700, see Table 5). As for oriental vegetables, 2006 data range between 800 and 5,000 growers, the previous figure probably refers to commercial farmers while most of the latter refer to very small scale producers. Data source are listed in Annex 2.

	Farmers	Area (ha)	Average Area/Farmer
Avocados	15,000	38,000	2.5
Pineapples	700	3,300	4.7
Greenhouses	4,800	870	0.2
Oriental vegetables	5,000	2,500	0.5
Cocoa	36,000	125,000	3.5
Total target commodities	61,500	169,670	2.8

A1. The Avocado Sector in the Dominican Republic

Avocado production in the DR is a major industry with most of the produce consumed domestically but with exports playing a significant role for commercial-oriented producers because of high prices fetched during the winter season in the U.S. market. Production is concentrated in the warm lowland of southern provinces and the cooler areas (above 900 m ASL) near the border with Haiti (see Graph A1 of Annex 1). Due to climatic variability between the growing regions, most of the major cultivars are available over an extended period. The different regions give the industry the ability to produce avocados year round, with the bulk of the crop from July to November and a significant share (almost a third) between December and February.

The area planted with avocados in the DR has expanded steadily over the past decades, from approximately 2,000 hectares in the 1970s to more than 38,000 ha in 2014. There are about 15,000 producers cultivating avocados, 87 percent of them small-scale farmers with less than 3 ha. Major cultivars are so-called “green” ones, in particular Semil-34 which alone account for about 60 percent of total production, while other main cultivars are Hass (15 percent), (local) *Criollos* (9 percent), and *Choquette* (6 percent), along with Carla (3 percent), Pollock (3 percent), and Lula (1 percent).

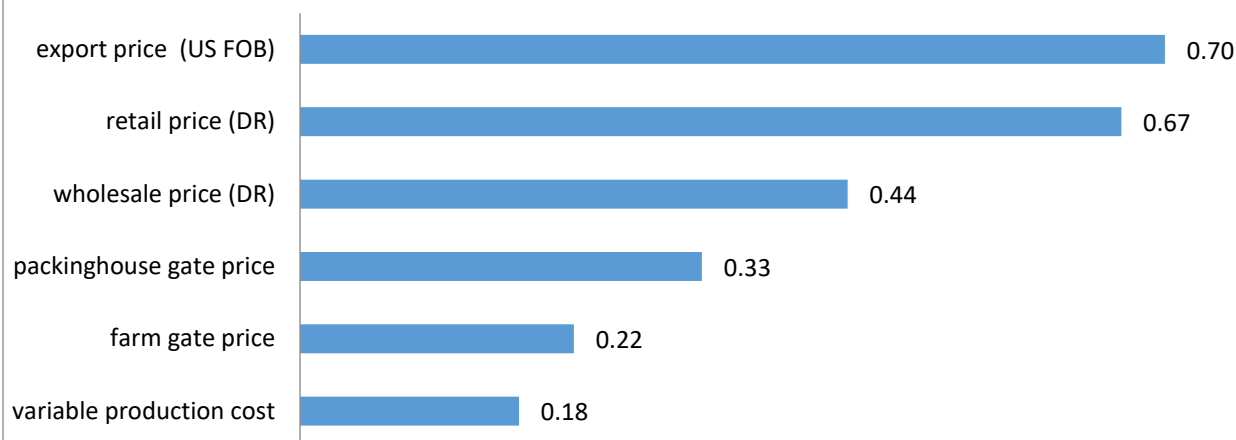
Table 6: Avocado Output

Quarter	Percent
Q1	28%
Q2	3%
Q3	45%
Q4	24%

**2014 Source: ONE, 2015*

Avocado sales in the domestic market are often facilitated by market agents (middlemen) after they have engaged with the farmers. Middlemen supply the informal markets (street hawkers and vendors), as well as sell directly to retailers and processors for manufacturing of guacamole and oil extraction. More commercial-oriented farmers use packaging houses to wash, sort, and package the produce usually for export, but occasionally for the domestic market in convenience stores and hypermarkets.

Chart 1: Avocado prices at various stages of the value chain, US\$ per fruit



Avocado production amounted to 428,300 MT in 2014, while exports totaled 19,300 MT and US\$ 22.5 million. Avocados contributed 28 percent (DR\$ 5.7 billion) to total gross value of fruits (DR\$ 20.3 billion) and 6 percent of total agricultural output of the Dominican Republic in 2014. The gross value of production increased by almost 60 percent between 2012 and 2014 and more than tripled when compared to a decade ago. Exports of avocados account for less than 5 percent of domestic output but 17 percent of value. In terms of export market size, the U.S. is the largest export market for Dominican avocados with a share of 78 percent in value (US\$ 17.6 million in 2014), while the EU market represents 18 percent (US\$ 4.1 million in 2014). Below the value chain for avocados is presented.

Table 7: Value Chain for Avocados	Production 2014			Exports 2014			Projected Exports 2016 (*)		
	MT	000 US\$	US\$/MT	MT	000 US\$	US\$/MT	MT	000 US\$	US\$/MT
Total avocado producers	428,301	131,519	307	19,272	22,530	1,169	5,974	7,886	1,320

(*) Exports of Avocados fell significantly in second and third quarter of 2015 due to U.S. ban for Medfly infestation; see below for more.

Late winter/early spring exports obtain the highest price on the U.S. market (when both California and Florida output is over). Average price for DR avocado exported to the U.S. was US\$ 2 per Kg in Q2 (April to June) of 2014 and US\$ 2.27/kg in Q2-2013 (but only US\$1.44/kg in Q2-2015 when the export ban due to Medfly infection applied), almost double than export price in the other period of the years (see Table 8). As for 2015, exports in second and third quarters refer to Hass varieties only.

Table 8: Avocado Export Prices (FOB US)	2013-Q2	2013-Q3	2013-Q4	2014-Q1	2014-Q2	2014-Q3	2014-Q4	2015-Q1	2015-Q2	2015-Q3
US\$/kg	2.27	1.25	1.00	1.38	2.00	1.27	0.98	1.12	1.44	1.19

A small part of the avocado output is processed either as the base for the Mexican dip known as guacamole, or for extracting high quality oil for cosmetic or culinary use. By and large, Hass variety is used in the production of Guacamole as well as for oil extraction. Indeed, Hass avocados have a higher content of fat (18 percent) than the green varieties such as Semil-34. Processed avocado products are mainly exported with only a small quantity

sold domestically in convenience stores or supermarkets. A total volume of less than 2,000 MT of avocados was processed in DR during 2014.

On March 18, 2015, the USDA Animal and Plant Health Inspection Service (APHIS) issued import restrictions on “host commodities from the Dominican Republic into or through the United States,” on detection of the Mediterranean Fruit Fly (*Ceratitis capitata*) aka Medfly in the Punta Cana region of the DR. Among the banned produce were all avocado varieties produced in the country, though in late April shipments of Hass variety avocados were allowed. Indeed, APHIS did not consider Hass avocados to be a fruit fly host. Due to this ban the exported value of avocados fell significantly (minus 65 percent) in the second and third quarters of 2015, with shipments to the U.S. down by 95 percent only partially offset by increased sales on Canadian and European markets. The average export decline for these two quarters was used to project the 2016 export volumes and value to be used as baseline value scenario if the ban continues for at least 24 months.

Exports to the U.S. could be resumed either by delimitating Medfly free zone from where produce could be shipped to the U.S. or by complete eradication. Avocado producers prefer the previous (being most of production located far away from the infected zone) but the Dominican government has chosen the latter that, if successful, would open up the whole export trade, but with the actual risk of an extended period of time before attaining complete eradication. Below the baseline value for avocados is presented, also including a baseline scenario that takes in consideration the hypothesis of the export ban still in place after two years of program implementation.²

Table 9A: Baseline Value for Avocados	(Formal) Domestic Sales 2014		Exports 2014		Projected Exports 2016	
	MT	000 US\$	MT	000 US\$	MT	000 US\$
Total avocado producers	21,415	13,152	19,272	22,530	5,974	7,886
Targeted beneficiaries	Baseline Production (20% of formal sales)		Baseline Exports (40% of exports)		Baseline Exports (ban 2+ years)(40% of exports)	
	4,283	2,630	7,709	9,012	2,390	3,154

Targeted producers which are direct beneficiaries of the program are estimated at 700, which account for about 35 percent of the roughly 2,000 trade-oriented producers of avocados in the DR. The baseline for volume and value sales of the targeted direct beneficiaries has been calculated as the sum of 20 percent of the 2014 figures for estimated formal sales and 40 percent of export figures, to take in consideration that beneficiary producers are more likely to export than average farmers but to sell less than average in the domestic market.

Table 9B: Baseline Value for Avocados	Formal Sales & Exports 2014		Scenario Formal Sales & Exports	
	tons	000 US\$	tons	000 US\$
Total avocado producers	40,687	35,682	27,389	21,037
Targeted beneficiaries	Baseline Total Sales		Scenario Baseline Total Sales	
	11,992	11,642	6,673	5,785

²It has been considered that even a two year ban would determine a more permanent (at least four years) damage to the export flows of avocados that are expected to regain pre-ban market share only at later stage. Indeed, it will take time before regaining export market shares lost for the ban. The export ban was repealed on January 7th 2016 for produce originating from 23 provinces.

A2. The Pineapple Sector in the Dominican Republic

In the DR, pineapple is a non-traditional cash crop grown mainly in two nearby provinces (*Sánchez Ramírez* with a 55 percent share and *Monte Plata*– 34 percent share) located respectively in the central and eastern regions (see Chart A1 in Annex 1). Currently, there are roughly 700 producers that cultivate approximately 3,300 ha of pineapple³. Most of these producers are small-to-medium scale farmers though growing pineapple on a commercial basis. Few large producers grow pineapple plantation of up to 100 ha, while the largest producer (*Grupo Vicini*) has some 300 ha planted of pineapple. Dominican Republic’s pineapple production is estimated at 350,000 MT (2014) but it is expected to increase significantly in 2015 in the next few years.⁴

Pineapple production can occur year round and indeed DR output is well staggered over time with a relative predominance of the winter season (see Table 10). Pineapple contributed 22 percent (DR\$ 4.4 billion) to total gross value of fruits (DR\$ 20.3 billion) and 5 percent of total agricultural output of the DR in 2014.

The current structure of the Dominican pineapple industry is characterized by rapid changes due to the deterioration of previous plantations and the planting of new MD2 varieties (aka *Dorada* or Golden) imported from Costa Rica. Pineapple commercial production started in the late 1980s with the arrival of two transnational companies (Dole Food Company and Chiquita Brands International) and increased rapidly up to early 2000s only to decrease in mid-2000s. This output as well as quality decline was due to the pullout of the two transnational companies as well as to the genetic deterioration of the pineapple planted in the country. The decline was accompanied by low sales prices (those, however, have stabilized again since 2007), and the shift of international demand from the formerly dominant Cayenne variety to the MD2 variety. Recently the Dominican government has started to implement a policy of varietal conversion and development of pineapple production for export. In particular, the Dominican government has financed the import of 10 million plants (pineapple suckers or shoots known locally as *hijuelos*) from Costa Rica with the aim of revitalizing the pineapple sector. These pineapple suckers of high genetic value were planted in the *Sanchez Ramirez* province from May 2013 onwards, with the first significant harvest in July to August 2014.

Table 10: Pineapple Output*

Quarter	Percent
Q1	32%
Q2	19%
Q3	25%
Q4	23%

*Dominican Republic, 2014;
Source: ONE, 2015

Despite good soil and climatic conditions and land availability, the DR is not among the big pineapple producer and exporter countries, also due to the slow uptake of the production of the newly introduced MD2 variety. Production is expected to take off again and pineapple output to continue to grow significantly in the next few years. For instance, the producers that benefitted from the procurement of the above mentioned propagating material are requested to repay the loan in kind within three years; since these pineapple suckers are expected to be supplied to other producers, the government program will benefit many more producers and significantly increase plantation and production of pineapple over time.

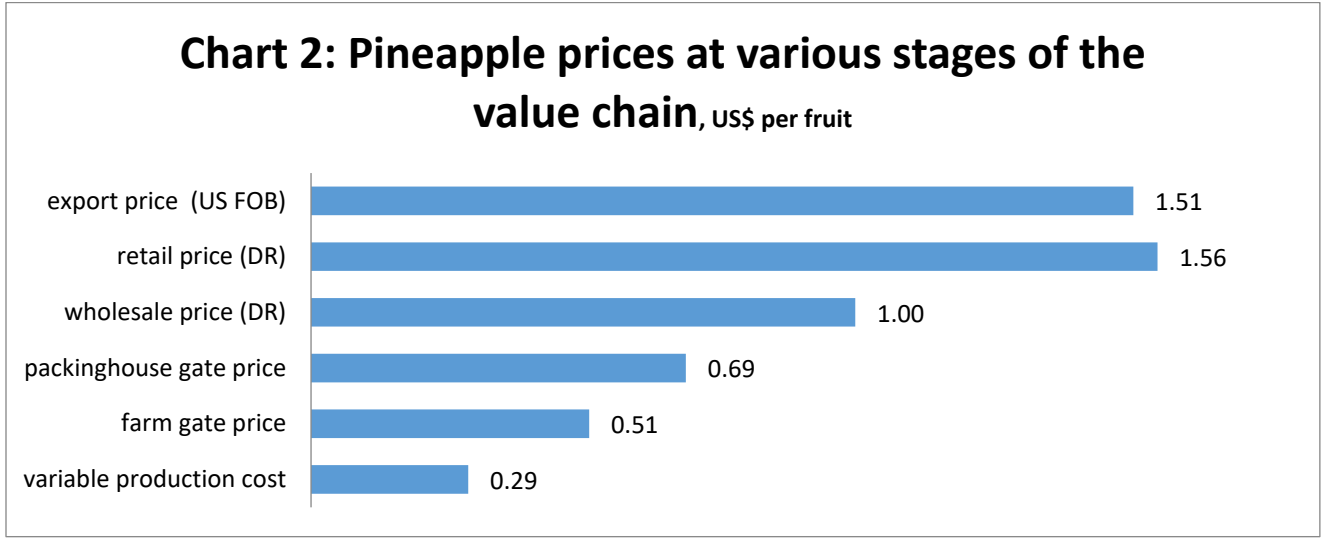
³No reliable statistics are available for area planted at pineapple. For instance, MinAg data suggest that in 2013 planted area amounted to 85,938 *tareas* (5,402 ha) while harvested area is almost double at 162,223 *tareas* (10,203 ha). ONE data for 2014 reports respectively 69,899 and 135,853 *tareas* (4,211 and 8,184 ha respectively), somewhat implying that the harvested area has been counted twice for accounting for a second harvest per year in most of the country. According to the Pineapple cluster of *Cevicos* there are 628 producers in the Dominican Republic planting an estimated area of 52,000 *tareas* (3,270 ha) at pineapple. One *tarea* equals 628.86 square metres.

⁴As for pineapple production, the starting base for calculation is the number of harvested pineapple unit (192,375 in 2014) to which ONE applies an average weight of 5 pound per pineapple, to obtain a total of 436,304 MT in 2014. However, considering that the standard weight for MD2 pineapple is between 3 (small size) and 5/5.5 (big) pound per unit and that for Cayenne Lisa between 2.5 and 5 pound/unit, an estimated harvested output of about 346,000 MT of pineapple has been estimated as actual production. This estimation is obtained by multiplying the number of harvested fruit for an average weight of 1.8 kg/unit.

The domestic production is still oriented to primarily supplying the domestic market, which is much more lucrative and less demanding than the international one. Indeed, Dominican pineapple output is mainly consumed domestically, with domestic supply unable to meet potential export demand and domestic sale prices equal to those fetched on export markets once transportation costs are taken into account. However, a small group of producers seems to be targeting foreign trade once the output reaches adequate volume to permit sea transportation to the EU. A small percent share of pineapple output is processed in juice and (frozen) pulp for sales to domestic retailers or further processing. Below the value chain for pineapples is presented.

Table 11: Value Chain for Pineapples	Production 2014			Exports 2014		
	MT	000 US\$	US\$/MT	MT	000 US\$	US\$/MT
Total pineapple producers	346,275	101,966	294	4,845	3,690	762

Exports represent just 1 percent of domestic production in volume (less than 5,000 MT) but almost 4 percent in value, due to the higher average price fetched by exports. Pineapples from the DR are mainly exported to the EU (US\$ 1.6 million in 2014 representing 44 percent of total exports), the U.S. (US\$ 0.9 million and 25 percent), and Israel (US\$ 0.6 million and 16 percent). Pineapple transported to the EU is often by air cargo (at a cost of up to US\$ 0.8 per kg), while shipping to the U.S. is by (refrigerated) sea cargo (at an average cost of US\$ 5,000 per container). Currently, the pineapple industry is trying to gain back market shares in Europe that were lost a decade ago due to both low quality and short supply of Dominican production following the pullout of Chiquita Brands International and Dole Food Company.



Below the estimated baseline value for pineapples is presented. Targeted producers that are direct beneficiaries of the program are estimated at 400, which account for about 64 percent of the 628 trade-oriented producers of pineapples in the DR. The baseline for volume and value sales of the targeted direct beneficiaries was calculated as the sum of 40 percent of the 2014 figures for estimated formal sales and 65 percent of exports, to take in consideration that beneficiary producers are more likely to export than average farmers but to sell less than average in the domestic market.

Table 12: Baseline Value for Pineapples	(Formal) Domestic Sales 2014		Exports 2014		Formal Sales & Exports 2014	
	tons	000 US\$	tons	000 US\$	tons	000 US\$
Total pineapple producers	17,314	10,197	4,845	3,690	22,159	13,887
Targeted direct beneficiaries	Baseline Domestic Sales (40% of formal sales)		Baseline Exports (65% of exports)		Baseline Total Sales (65% of formal sales and exports)	
	6,926	4,079	3,149	2,399	10,075	6,477

A3. The Greenhouse Sector in the Dominican Republic

Greenhouse production in the DR is an export-oriented industry aimed primarily at the U.S. market where higher prices can be obtained. The production is concentrated mainly in the cooler valleys of the central part of the country. The area under greenhouses is concentrated in two provinces, *La Vega* (33 percent) and *San Jose de Ocoa* (25 percent). Production in most cases is organized in clusters⁵ and there are an estimated 4,800 producers of greenhouse vegetables. Greenhouse-environment production has gained popularity in the country in the last decade, due to the quality of its output and the profitability of the operations. Greenhouse production focuses mainly on vegetables for export, such as tomatoes, peppers, cucumbers, zucchini, as well as some oriental vegetables (in particular but not exclusively hot peppers).

Output of greenhouse vegetables grew steadily during the last decade (it was less than 2,000 MT in 2004) due to increased areas under protection (from 25 ha to about 870 ha) and the adoption of modern hydroponic techniques and selected seeds that has increased yields. Production of greenhouse vegetables totaled almost 60,000 MT in 2014, of which peppers were 32,200 MT (54 percent), tomatoes 18,250 MT (31 percent) and cucumbers 6,000 MT (10 percent). Oriental vegetables produced under greenhouses amounted to ~2,000 MT.

Produce can be grown throughout the year, though output is mainly concentrated in the period November to May when DR greenhouse produce have the highest demand (and fetch the highest price) in the U.S. market. Exports of greenhouse vegetables totaled almost 42,000 MT, of which peppers 23,500 MT (61 percent), tomatoes 8,400 MT (22 percent) and cucumbers 4,750 MT (12 percent). Peppers are mainly exported to the U.S. (US\$ 21.8 million or 78 percent of total), the EU (US\$ 2.4 million or 9 percent) and Canada (2.2 million or 8 percent). Major markets for DR tomatoes are the U.S. (US\$ 4.1 million or 45 percent of total), Haiti (US\$ 2.6 million or 28 percent), and the EU (US\$ 2.1 million or 23 percent).

Because the Dominican greenhouse industry is mostly export-oriented, the gross value of production is heavily reliant on international prices and their fluctuations. The gross value of the exported production at the farm gate is estimated at US\$ 11.3 million but when exported this value increase almost four-fold to US\$ 40.6 million. The gross value of production increased by one third between 2012 and 2014 and almost tripled when compared to 2008. Below the value chain for greenhouse vegetables is presented.

⁵ These include the main greenhouse cluster in Santo Domingo and six related organizations located in San José de Ocoa, Constanza, Jarabacoa, Hato Mayor, Salcedo and the North East.

Table 13: Value Chain for Greenhouse Vegetables	Production 2014			Exports 2014			Projected Exports 2016 (*)		
	MT	000 US\$	US\$/MT	MT	000 US\$	US\$/MT	MT	000 US\$	US\$/MT
	Tomatoes	18,247	5,454	299	8,436	9,230	1,094	6,158	7,015
Bell Peppers	30,714	10,884	354	23,502	27,887	1,187	3,290	4,462	1,356
Cucumbers	5,983	626	105	4,749	3,507	738	4,749	3,507	738
Others	3,035	3,317	1,093	1,807	8,621	4,772	1,807	8,621	4,772
Total greenhouse producers	57,980	20,281	350	38,494	49,245	1,279	16,005	23,605	1,475

(*) Tomatoes and peppers are directly affected by U.S. ban for Medfly infestation and their exports fell significantly in the second and third quarter of 2015

Production data for greenhouse vegetables are from the ONE, trade data from ITC Trade Map. Hot peppers are considered oriental vegetables; hence, are not included in this baseline value. Trade data of cucumbers by ITC Trade Map include both open air and greenhouse tomatoes, therefore ONE export data were used⁶.

On March 18, 2015, the USDA Animal and Plant Health Inspection Service (APHIS) issued import restrictions on “host commodities from the Dominican Republic into or through the United States,” on detection of the Mediterranean fruit fly (*Ceratitis capitata*) in the Punta Cana region of the DR. Among the banned produce were peppers and tomatoes, though in late April shipment of green tomatoes were allowed. Indeed APHIS did not consider green tomatoes to be a fruit fly host, and that to be considered green the fruit’s surface must be “less than 30 percent pink or red at the time of harvest.” Due to this ban, the export value of both peppers and tomatoes collapsed in the second and third quarter of 2015. Export value of peppers was down by 84 percent (year-on-year) while tomatoes fell by 24 percent, with huge losses on the U.S. market partially offset by increased sales on Canadian and European markets. The average export decline for these two quarters was used to project the 2016 export volumes and value to be used as baseline value scenario if the ban stays on.

Exports to the U.S. could be resumed either by delimitating Medfly free zone from where produce could be shipped to the U.S. or by complete eradication. Greenhouse producers prefer the previous (the majority of them being located far away from the affected areas) but the Dominican government has chosen the latter that, if successful, would open up the whole export trade, but with the actual risk of taking an extended period of time before attaining it. Below the estimated baseline value is presented together with a baseline scenario that takes in consideration the hypothesis of the export ban still in place after two years of program implementation⁷.

⁶ONE statistics for greenhouse peppers’ exports are significantly higher than exports of all peppers (open air and greenhouse) provided by ITC Trade map. The latter may also include exports of hot peppers. ONE statistics for exports of greenhouse tomatoes are also higher than exports of all tomatoes (open air and under shed) as of data from ITC Trade map.

⁷It has been considered that even a two-year ban would determine a more permanent (at least four years) damage to the export flows of avocados that are expected to regain pre-ban market share only at later stage. Regaining lost export market shares is expected to take a long time (longer than the four years of program duration). The export ban was repealed on January 7, 2016 for produce originating from 23 provinces.

Table 14 A: Baseline Value for Greenhouse Produce

	(Formal) Domestic Sales 2014		Exports 2014		Projected Exports 2016	
	tons	000 US\$	tons	000 US\$	tons	000 US\$
Tomatoes	912	545	8,436	9,230	6,158	7,015
Bell Peppers	1,536	1,088	23,502	27,887	3,290	4,462
Cucumbers	299	63	4,749	3,507	4,749	3,507
Others	152	332	1,807	8,621	1,807	8,621
Total greenhouse produce	2,899	2,028	38,494	49,245	16,005	23,605
	Baseline Production (20% of formal sales)		Baseline Exports (20% of exports)		Baseline Exports (ban 2+ years) (20% of exports)	
Targeted beneficiaries	580	406	7,699	9,849	3,201	4,721

Targeted producers that are direct beneficiaries of the program are estimated at 700, which account for about 20 percent of the roughly 3,500 trade-oriented greenhouse producers in the DR. The baseline for volume and value sales of the targeted direct beneficiaries was calculated as the sum of 20 percent of the 2014 figures for both estimated formal domestic sales and export of greenhouse produce.

Table 14B: Baseline Value for Greenhouse Produce	Formal Sales & Exports		Scenario Formal Sales & Exports	
	tons	000 US\$	tons	000 US\$
Tomatoes	9,348	9,775	7,071	7,560
Bell Peppers	25,038	28,975	4,826	5,550
Cucumbers	5,049	3,570	5,049	3,570
Others	1,958	8,953	1,958	8,953
Total greenhouse producers	41,393	51,273	18,904	25,633
	Baseline Total Sales		Scenario Baseline Total Sales	
Targeted beneficiaries	8,279	10,255	3,781	5,127

A4. The Oriental Vegetables Sector in the Dominican Republic

The cultivation of oriental vegetables in the DR began in 1978 when immigrants of Asian origin introduced them in the province of La Vega. This province now account for roughly half of the domestic production of oriental vegetables, with some 3,500 persons involved in the value chain of production, packaging and transport of the products. The production of oriental vegetables in the DR has increased considerably in the last few years and more than five thousand producers are involved in this economically profitable activity in the whole country. Roughly, 900 of these producers are cultivating some 2,000 ha on a commercial basis while the remaining producers –more than 4,000 - cultivate just 500/600 ha.

There is no recent (specific) statistical data on area cultivated with oriental vegetables, the last available data being about 2,500 hectares and a production of 16,700 MT (2006). Current production has been estimated at about 20,000 MT per annum. Initially, yields of Asian varieties were well below international average, but after decades of experiences, the producers of these vegetables have managed to improve their productivity via the use of imported seeds and enhancement in the methods of cultivation.

Various exporting companies control the marketing of the oriental vegetables either by producing directly or acquiring the produce of local farmers. The main oriental vegetables produced in the DR are the following: (Long Chinese, Round Indian) eggplants, hot peppers (chili), Chinese okra or Musù (Loffa),(Indian and Chinese) bitter melons (*cundeamor*), long squash or calabash gourd (*bangana*), long beans (*vainitas*), bitter gourds, baby cucumber, or ivy gourds (*tindora*).

A small part of the oriental vegetables output is consumed domestically, but the large majority is exported. Exports target the U.S. and Canada where there is a growing demand for these by the resident populations of Asian origin. More than 13 million people of Asian origin live in the U.S. and some 7 million in Canada. In the DR, oriental vegetables are mainly sold to supermarkets and hotels, though they can also be found at informal markets of main cities (Santo Domingo and Santiago). Produce for exports are packaged in carton boxes while the produce sold in the DR is packaged in plastic boxes to be frozen before being stocked on shelves.

No specific statistics exists on the production and trade of oriental vegetables; hence, data was taken for a number of selected products for which statistics data exist (eggplant, hot peppers, okra, and long beans) and used as a proxy for establishing baseline values. For instance, eggplants produced in the DR include both oriental (Indian and Chinese) and western varieties. The statistical data aggregate them all together. Since the Dominican production of oriental vegetables is mostly exported, the available export data was used as the reference baseline values, because they are more likely to include oriental rather than western vegetables. In particular it was assumed that only half of the domestic production of eggplant is of oriental varieties; for long beans, no production data is available while export statistics are provided by ITC Trade Map. Therefore, production has been estimated at 110 percent share of export figures (i.e. about 90 percent of production is exported).

As of hot peppers, ONE statistics were used for both production and export data. This is because the ITC Trade Map statistics relevant to this produce include items others than specifically hot peppers. It should be noted that ONE figures indicate very high average export price for hot peppers (US\$ 5.5 per kg), that can be hardly justified even if traded as dried chili or powder rather than fresh produce⁸. Therefore, the export value has been recalculated using an average export price of US\$ 1,350 per MT. For okra, production data are from ONE, trade data from ITC Trade Map. Below the value chain for oriental vegetables is presented.

Table 15: Value Chain for Oriental Vegetables	Production 2014			Exports 20014		
	MT	000 US\$	US\$/MT	MT	000 US\$	US\$/MT
Chinese & Indian Eggplants	11,102	3,901	351	10,295	7,255	705
Long Beans	2,661	947	356	2,419	1,721	711
Hot Peppers	1,457	545	374	1,298	1,752	1,350
Okra	4,220	1,557	369	435	583	1,341
Total main oriental vegetables	19,439	6,949	357	14,446	11,311	783

Export of oriental vegetables amounted to almost 14,500 MT valued at US\$ 11.3 million in 2014, representing three quarters of DR output volume but almost twice its value. Major export markets are the U.S. (28 percent of eggplants, 59 percent of long beans, 82 percent of chili, and 29 percent of okra); Canada (42 percent of eggplants and 12 percent of long beans); and, the EU (25 percent of eggplants, 28 percent of long beans, and 70 percent of okra). The U.S. import ban for Dominican peppers due to the Medfly infestation has not only

⁸For instance, import price of hot peppers averaged Euro 2.6 per Kg and Euro 1.1/ kg for respectively dried and fresh produce imported by Italy in 2014. The latter price is used as a proxy for the export price of chili from the Dominican Republic.

negatively affected exports of hot peppers, but Canada-bound vegetables too. Containers are inspected (and banned produce rejected) in transit in-route to Canada in most U.S. ports (Philadelphia port is the exception).

Below the baseline value for oriental vegetables is presented. Targeted producers, which are direct beneficiaries of the program, are estimated at 500, which account for about 56 percent of the roughly 900 trade-oriented producers of oriental vegetables in the DR. The baseline for volume and value of sales of the targeted direct beneficiaries is calculated as the sum of 50 percent of the 2014 figures for the estimated oriental vegetable formal sales and 60 percent of export figures. The calculation takes into consideration that beneficiary producers are more likely to export than average farmers growing oriental vegetables, but to sell less than average in the domestic market.

Table 16: Baseline Value for Oriental Vegetables	(Formal) Domestic Sales 2014		Exports 2014		Formal Sales & Exports 2014	
	Tons	000 US\$	Tons	000 US\$	Tons	000 US\$
Chinese & Indian Eggplants	555	390	10,295	7,255	10,850	7,645
Long Beans	133	95	2,419	1,721	2,552	1,816
Hot peppers	73	54	1,298	1,752	1,370	1,806
Okra	211	156	435	583	646	739
Total oriental vegetable producers	972	695	14,446	11,311	15,418	12,006
	Baseline Production (50% of formal sales)		Baseline Exports (60% of exports)		Baseline Total Sales	
Targeted direct beneficiaries	486	347	8,668	6,786	1,370	1,806

A5. The Cocoa Bean Sector in the Dominican Republic

Cocoa production in the DR is mainly export-oriented production. The DR has around 36,000 mainly small-scale cocoa farmers that produce between 54,000 and 70,000 MT of high quality cocoa a year, mainly for export. Production of cocoa beans totaled 69,600 MT in 2014, 98 percent of which was exported for a total value of US\$ 212 million. The great majority of exports are cocoa beans (97 percent), of which 38 percent organic, with processed product such as cocoa butter, cocoa powder, cocoa mass and chocolate consumables accounting for the remaining 3 percent. Cocoa is the third exported product of the DR. The DR is the world’s largest exporter of organic cocoa.

Around 85 percent of the cocoa producers are small producers and as many as 55 percent of them cultivate less than 1.5 hectares on a non-commercial basis (hence they only pick the beans and usually do not nurture the plants nor expand the cultivation). Area under cocoa cultivation amounts to 125,000 hectares, mainly located in the central and eastern part of the country.

The 36,000 cocoa farmers produce wet beans and take them to 60 facility centers that conduct fermentation, drying, packing, and exporting. There are 10 processors including cooperatives such as CONACADO but also manufacturers of chocolate products such as Rizak (KaoKa), Xocolat, Cortes, Munné, Chocal that toast and grind cocoa beans to get cocoa nibs that are milled until getting a fine and homogenous mass, and finally cocoa paste (or liquor), from which cocoa butter and cocoa cake are obtained through filtration. Cocoa butter represents 45 percent of the liquor. The filtration separates the liquids (cocoa butter) from the solid (cocoa cake). The cocoa cake is then grinded to obtain cocoa powder. Finally, there are 20 exporters with a total 68,200 metric MT of

cocoa exported in 2014. Major exporters are CONACADO accounting for 24 percent of exports in volume, Roig Agrocacao (16 percent), Rizek Cacao (14 percent), Coopcanor (12 percent), Biocafcao (8 percent), Cooproagro (8 percent), and Munné (6 percent).

In the past, the whole of Dominican cocoa production was low-quality, unfermented beans that were purchased from the cocoa farmers by the four major Dominican exporters that shipped the beans mainly to the United States. With the formation of cooperatives, such as CONACADO, Coopcanor, Cooproagro, etc., the associated farmers were able to produce their own semi-finished products, rather than selling their beans to be processed by chocolate companies; hence, adding value to their products. For instance, CONACADO members produce approximately one quarter of the cocoa exported from the DR and about 70 percent of their cocoa is sold at a premium as high quality fermented beans, primarily to European niche markets: organic (55 percent of their exports), Fair Trade (40 percent), and biodynamic.

Cacao wet fermentation is a technique that improves the quality of cacao production and was introduced by CONACADO in the Dominican Republic in mid-1980s. Wet fermented beans are classified as *Hispaniola*, which command higher value add but account for less than 40 percent of DR production due to lack of wet fermentation equipment and technical knowhow. Dry un-fermented beans, are classified as *Sanchez*, which represent the majority of cocoa produced in DR (60 percent). The drying processes include both outdoor sun drying and drying tunnels. As for exports, cocoa *Sanchez* accounts for 49 percent of total exported volumes, *Hispaniola* organic cocoa for 26 percent, organic cocoa *Sanchez* for 11 percent and cocoa *Hispaniola* for 10 percent. Below the value chain for cocoa beans is presented.

Table 17: Value Chain for Cocoa Beans	Production 2014			Exports 2014		
	MT	000 US\$	US\$/MT	MT	000 US\$	US\$/MT
Total cocoa producers	69,633	188,434	2,706	68,196	212,116	3,110

Major export markets are the EU with a 53 percent share in value, the U.S. (32 percent), Mexico (9 percent), and Switzerland (2 percent). In addition to cocoa beans, in 2014 the Dominican Republic exported cocoa butter for US\$ 8.9 million (mainly to the U.S. -81 percent and the EU -18 percent); cocoa powder for US\$ 1.1 million (mainly to the U.S. – 88 percent, New Zealand – 6 percent, and Trinidad & Tobago – 5 percent), cocoa waste for US\$ 0.8 million (to the EU -68 percent and the U.S. – 32 percent), and chocolate for US\$ 3.2 million (mainly to the U.S. – 76 percent, Haiti -10 percent, and Venezuela – 6 percent).

Below the baseline value for cocoa beans is presented. Targeted producers that are direct beneficiaries of the program are estimated at 700, which account for about 18 percent of the roughly 4,000 trade-oriented producers of cocoa beans in the DR and about two percent of total producers. The baseline for volume and value sales of the targeted direct beneficiaries was calculated as the sum of four percent of the 2014 figures for both estimated formal sales and export of cocoa beans. Indeed, even the smallest producers are able to sell their produce through cooperatives or middlemen and the baseline value of the beneficiaries has been estimated as double the average sales.

Table 18: Baseline Value for Cocoa	(Formal) Domestic Sales 2014		Exports 2014		Formal Sales & Exports 2014	
	tons	000 US\$	tons	000 US\$	tons	000 US\$
Total cocoa beans producers	6,963	18,843	68,196	212,116	75,159	230,959
Targeted direct beneficiaries	Baseline Production (4% of formal sales)		Baseline Exports (4% of exports)		Baseline Total Sales (4% of formal sales & exports)	
	279	754	2,728	8,485	3,006	9,238

B. Average percent reduction in time a product takes to get through problem points in a value chain (Result Indicator 11)

Result Indicator 11 of the USDA financed EQS program measures the average percent reduction in time a product takes to get through problem points in the value chain. This performance indicator tracks the change in time (expressed in percent of time reduced) of target commodities getting through pre-identified specific problem points in the value chain that the program will help to address. Such a reduction will measure the increased efficiency of post-production processes. The baseline evaluation identified several illustrative problem points for each commodity group, which are discussed in the following section.

B1. Avocado Value Chain Problem Points

Problem point 1: Global GAP certification takes time to be awarded while could be done quicker with adequate technical assistance. Due to the blockage of export to the U.S. because of Medfly infestation producers of non-Hass avocados are looking to the EU market as an alternative destination for their exports. Since March 19 2015, exports to EU has increased significantly (almost doubled though from a low base) but to ensure a steady and sustainable flow of produce to non-U.S. markets, Global GAP certification is needed. A number of producers have already obtained or are close to obtaining such a certification, while others are initiating the process. This takes time and has a cost (on average US\$ 5,000 per a four ha farm to get a certification and an annual fee of about US\$ 2,000) and technical knowledge is a scarce resource to meet the demand of possibly interested producers. The program may facilitate the process of obtaining Global GAP certification for the direct beneficiaries, reducing the time of certification attainment from 12 months (or more) to 9 months (or less) for groups of 25 producers per cluster or association and from four years to 2.8 years on average for at least one quarter of targeted direct beneficiaries growing avocados.

Problem point 2: Water conservation is needed for emergency watery of the avocado plantations in case of drought. Climate change-related effects have increasingly caused prolonged drought that provoke water stress to plantations that, if protracted for too long, can cause the loss of the whole crop. There is then a need to introduce or extend water conservation plans in order to provide a minimum supply of water to stressed plantations, especially in crucial seasonal periods (such as flowering). The program could provide advice (and/or small grants) on how to improve the harvesting of water, for instance by collecting rain water that is redirected to a deep pit or to a reservoir with percolation to be used for irrigation. In addition, technical advice and assistance designed to increase soil organic matter using green manures, mulching, and recycling of crop residues to increase the water holding capacity of soils and its ability to absorb water during torrential rains, which is a way to optimize the use of rainfall and irrigation during dry periods in the season. To reduce the problem point time by at least 30 percent, reduce the time needed to prepare reservoirs (for harvesting rain

water to be used for irrigation) and the adoption of good agricultural practices (to increase the holding capacity of the soil) from 6 months (or more) to 4 months (or less).

B2. Pineapple Value Chain Problem Points

Problem point 3: Delayed transfer of technical knowledge that leads to shorter productive life of pineapple plantations. DR plantations of pineapple have a shorter productive life than in Costa Rica. There is a need to facilitate the introduction of MD2 varieties and/or their replacement due to biodegradation and lower productivity of existing plantations. The MD2 is a commercial and highly successful hybrid variety, with a golden skin color when mature. The pulp is sweeter with lower fiber and acidity, and it can contain as much as four times more vitamin C than conventional varieties. . It has a post-harvest shelf life of 30 days, i.e. nine days longer when compared to other varieties and it is able to survive in cold storage for up to two weeks. It was originally introduced in Costa Rica and has become the standard variety for most large pineapple producers in Latin America and Asia. In the DR, the MD2 was introduced in early 2000, but plantation productivity declined significantly after a decade. In 2013, new MD2 propagating material was imported from Costa Rica, but technical assistance is needed to avoid biodegradation of the plantations. Relevant knowledge on how to deal with the new propagating material is low in the DR. The program may thus train technicians on these matters either through visiting foreign (e.g. Costa Rican) experts and/or organizing visits to Costa Rica (or other relevant country) for Dominican technicians. This technical assistance is expected to prolong the productive biological life of the new plantations by at least 30 percent at the end of the program. To reduce problem point time by 30 percent, reduce the time needed for the transfer of technical know-how from 24 months (or more) to 15 months (or less) in order to attain longer economical life of pineapple plantation before productivity biodegradation.

Problem point 4: Organic production of pineapple has great market potential but supply of organic pineapples is smaller than potential output. Organic pineapple production is small in the DR though there is an untapped market for this value-added produce, especially in the European market. Pineapple sold as organic can fetch a price of US\$ 0.7 per kg on the domestic market (at packinghouse gate), well above current market price of conventional pineapple. On the international market, organic produce fetches price premiums of between 15 to 30 percent. For this value added produce to be sold at a premium price an organic certification is needed. Usually a 36-month transition period is needed to certify that a produce has been organically grown, but in the DR this process can take several months longer. The program could therefore facilitate the certification process through technical assistance to pineapple producers in order to reduce the transition time close to the standard 36 months. Reduce the problem point time by 30 percent by shortening the transitional period for a pineapple orchard to be certified as organic from 60 months (or more) to 40 months (or less).

B3. Greenhouse Value Chain Problem Points

Problem point 5: Results for pesticide residue contents analyzed in approved labs take too long to reach the producers and export opportunities can be lost or shipment rejected (if not analyzed) . Possible solution is to provide producers with a kit that indicate level of residue against permitted thresholds. Exports are rejected when residue levels are above permitted thresholds. The few labs in the DR are usually located far from producing areas and it takes days to get the results of analysis. MinAg had provided test kits that did not show the level of residues but only whether or not such residues existed. In any case, procurement of these kits was dismissed. The program can help by identifying suitable test kits and/or procure them at an accessible cost. Field test kits for pesticide residues can be used to assess the amounts or levels of pesticide residues in fruits and vegetables using sensitive detection methods determining the tolerable levels of pesticide residues without the

use of sophisticated equipment. The test kits need to be handy to be used in the field or in the market place. The results are made available in only a few minutes, thus recommendations may be done on the spot. Farmers can therefore put a premium on their crops that are screened for pesticide residues using these test kits. The target is to reduce waiting time for obtaining the level of pesticide residue in the produce from several days to minutes by providing handy and reliable test kits.

Problem point 6: Some producers lack the expertise to grow alternative produce to replace (U.S. market)

banned products. There is a need to provide training for improving the capacity of producers and technicians in cultivating alternative produce (rather than peppers) to meet (perceived) untapped demand both at domestic and export markets. For instance, a producer in Jarabacoa said he wanted to grow cucumbers to export them to the U.S. market where (he believes) there is a significant untapped market for these produce but he could not because he and the technicians advising him lack the relevant expertise⁹. A possible substitute to U.S.-market banned peppers could be the growing of strawberries in the greenhouse. Although strawberry is currently produced in plastic tunnels, there is an actual unmet demand (imports of strawberry totaled 450 MT valued at US\$ 1.7 million in 2004, mainly imported from the U.S.) that could be met by produce harvested in greenhouses at least until the export ban is lifted. Moreover, the introduction of new produce could create the basis for future improved production capability. To reduce the problem point time by at least 30 percent, shorten the period for greenhouse producers to introduce the cultivation of (relatively) non- traditional produce from 12 months (or more) to 8 months (or less).

Problem point 7: There are limited number of exporters and/or importers that serve as reliable export outlets for high quality produce.

In certain circumstances, producers are unable to export their produce for lack of or insufficient export channels. For instance, greenhouse producers of *Rancho Arriba* (*San José de Ocoa* province) have currently just a single exporter to market their produce, though few of them can also sell produce directly to U.S.-based importers (though not peppers as of now). A target for the program could be to expand the number of export outlets. To reduce the problem point time by at least 30 percent, shorten the period for greenhouse producers to find alternative export channels from 20 months (or more) to 12 months (or less).

B4. Oriental Vegetables Value Chain Problem Points

Problem point 8: Slow (or non-existent) Global Gap certification rates, especially for exporting to the EU

markets. The acquisition of Global Gap certification can be facilitated by introducing Good Agricultural Practices in pest management and reducing the level of pesticide residues in the exported produce. Currently, for instance, there is an intensive use of fumigations especially for controlling TRIPS infestations that need to be reduced if Global Gap certification is to be obtained. Oriental vegetables production could greatly benefit by the application of Integrated Pest Management and the introduction of microbial agent that can control or suppress the growth and multiplication of insect pests and thus reducing the need of fumigations or pesticide use. The program could introduce a pilot project to reduce the use of fumigation and other pesticides by applying Integrated Pest Management in a number of selected nearby, medium-sized farms in order to facilitate their obtainment of the Global Gap certification. To reduce the problem point time by at least 30 percent, shorten the period for a group of a dozen producers of oriental vegetables to get Global Gap certification from 4 years (as a proxy for never) to 32 months (or less).

⁹Readers should be aware that cucumbers are already largely produced in DR both in greenhouses and open field, hence there is no technical difficulties in obtaining such a produce.

Problem point 9: Marketing to the U.S. of certain produce is restricted due to Medfly infestation, but once dried these produce could become exportable to the U.S. The program could provide grants to support the purchase of drying machineries to transform fresh chili into dried chili (or in powder) in order to add value to produce and avoid ban of exports to the U.S. due to Medfly infestation. The dryer may greatly help the fruit and vegetable postharvest value added as it can be used for chili peppers and other high-value crops such as pineapple, mango, and bell peppers as well as cocoa beans. Once dried entry of peppers into the U.S. territory will not be subject to the current Medfly related ban; therefore, permitting the export of value added produce. Also, these produce could be marketed locally as well as to other foreign markets. To reduce the problem point time by at least 30 percent, shorten the drying time of a produce from several days to approximately 6 hours.

B5. Cocoa Beans Value Chain Problem Points

Problem point 10: Cocoa orchards need renovation. The Dominican cocoa is known for its high quality but cocoa orchards need to be renovated with clones of high productivity and special quality characteristics (e.g. fruity flavors); also, cocoa trees need to be planted together with high value forestry species that would provide shadow to the cocoa trees while granting additional income by the sales of high value wood in due time. The EQS program could provide technical assistance to design the optimal tree density of the new cocoa orchards and the associated forestry species as well as grants to shorten the introduction period of these new plantations. To reduce the problem point time by at least 30 percent, shorten the period for cocoa producers to introduce new high quality cocoa clones and forestry species from 24 months (or more) to 15 months (or less).

Problem point 11: Process of wet fermentation not homogenized. The DR cocoa industry has pioneered the wet fermentation that adds quality and value to the exported cocoa products. However, most of the wet fermentation is done in open air, a process that does not guarantee homogeneous quality of the semi-processed produce. Significant investments are needed to purchase stainless steel tanks (the same used for making wine, or brewery tanks) to perform standard homogeneous fermentation. The program could help provide technical assistance as well as grants for facilitating the supplying of these fermentation tanks. To reduce the problem point time by at least 30 percent, shorten the period for cocoa producers to purchase fermentation tanks from 24 months (or more) to 15 months (or less).

Problem point 12: Few alternative cocoa-based products for local tourist market. The program could carry out marketing research to identify demand of alternative cocoa products for local and foreign tourist markets, including the potential market for new raw food products. This may include an assessment of capability and potential capacity for micro-processing cocoa nibs and possible further processing into chocolate for local tourist markets. To reduce the problem point time by at least 30 percent, shorten the period for cocoa producers to introduce alternative (raw or semi-processed) products in the local markets from 24 months (or more) to 15 months (or less).

C. Average Organizational Capacity Score (OCI) of Target Producer Groups (Result Indicator 17)

The Organizational Capacity Index (OCI) is an objective measurement expressed in numbers, in a prearranged scale, of the levels of development of producer organizations, from the point of view of the following: i) the democracy in the managing of the organization; ii) the provision of services to the members; iii) the economic and financial performances; iv) the human development of the members; and, v) aspects of management, administration and running of the organization.

The OCI exercise allows the evaluation of the organizational capacity of the association by identifying -through performance scoring, which are the areas of major strength in management and, which areas are in need of capacity building to strengthen the management of the organization. As a tool of diagnosis, the OCI facilitates the analysis of performance of the organization and informs the provision of support for improving or adjusting the organizational performance. It allows for prioritization of strategies and activities of organizational strengthening against available resources, in such a way that allows the organization to effectively leverage its business management in the medium term.

In order to analyze the organizations in a participative, rapid and efficient way, the application of the Organizational Capacity Index seeks the following:

- a) To establish, with the interview of executives and management, the level of actual performance of the organization;
- b) To identify strengths and weakness of the organization in order to propose relevant strategies of improvement;
- c) To stimulate the change of attitude of the management and/or members in order to improve the performances of the organization;
- d) To orientate the development of an organizational strengthening plan with specific actions, responsibilities, and timing;
- e) To efficiently allocate the capability of the available human, technical, economic, and administrative resources to develop the plan of proposed capacity strengthening;
- f) To facilitate the identification of institutional, public or private, relevant sources, which support the development of the planned strengthening activities; and,
- g) To facilitate the formulation of indicators for monitoring progress, for each organizational area of the business, in accordance with the formulated plan.

The OCI tool has a wide scope. Depending on what one wants to obtain by applying it, the index allows, in a practical and participative way, to diagnose the performance of the organization, to develop plans of capacity strengthening consistent with the diagnosis as well monitoring and evaluating these strengthening activities. The tool, by assessing the performance of the organizations and providing higher scoring points for efficient organizational capacity, helps to consolidate the actions that make the envisaged activities sustainable. The aim is that the organizations become more efficient in administration and more profitable in their business, with the final goal of attaining the improvement of the quality of life of the associated members and their families.

Furthermore, a participative, rapid and efficient diagnosis of the organizations allows identifying more precisely the goals to be reached, which helps to propose strategic plans to become more professional (mission, vision, aims, strategies, etc.). The advantage of having strategic plans is that there is a permanent focus on facilitating the productive, social, and economic growth of the organizations, with no risk of having such attention turned aside by relating to transitory situations. On the contrary, the strategic plans allow the use of external temporary supports and corrective actions to achieve the goals assessed by the organizational capacity diagnosis.

The EQS program result indicator #17 refers to the average score of a target producer group. Each target producer group will receive an index score using the OCI methodology. A baseline value is to be determined for each association at the beginning and at the end of the program in order to assess improvements in the organizational capacity of the groups as a result of the program activity. As for the baseline, the OCI process was undertaken for five clusters or associations to test the methodology and present the average baseline score.

Below a quantitative ranking scheme is presented to compare the baseline performances of the organizations and to provide a summary of quantitative input for each cross section of point of entry, core issue, and functional capacity selected.

Table 19: OCI Score for Five Organizations (Four Clusters and One Cooperative), As a Percent Share of Maximum Score

	Maximum Score	Avocado Cluster Cambita	Pineapple Cluster Cevicos	Greenhouse Cluster Jarabacoa	Oriental Vegetables Cluster La Vega	Cocoa Bean CONACADO Cooperative Cutui	Avg
Total OCI Score	100	91%	72%	66%	77%	93%	80%
Democracy Aspects	20	80%	73%	75%	98%	88%	83%
Economics & Finance	15	93%	80%	20%	60%	87%	68%
Management & Administration	20	100%	70%	70%	90%	90%	84%
Services Provided	35	89%	69%	71%	63%	97%	78%
Human development	10	100%	70%	90%	80%	100%	88%

The resulting scores appear to be relatively high, especially for the avocado cluster of Cambita and the cocoa bean CONACADO cooperative of Cutui. However it should be taken into consideration that the selected organizations are somewhat the sophisticated ones, all of them having experienced various years of technical and financial assistance from both national and foreign organizations. These associations also have an unusual (for the sector) participation of women in management or executive roles even though on average only 5 percent of the associated members are women. Moreover, all of them and their associated members get technical assistance on a daily basis by agronomists employed by the MinAg. This implies that all but one of the examined organizations get as many as 18 points (e.g. 18 percent of total) for technical assistance that is actually paid for by the state rather than by the associations themselves. Nonetheless, the cross section analysis of the above ranking scheme provides some useful information about which technical assistance is needed for each organization, with “economics & finance” and “services provided” as the main areas where the EQS program could provide assistance.

It is suggested to take the lowest of the cross sector ranking score as the starting point to evaluate program progress, because the OCI tool has been tested on organizations that have been receiving technical and financial assistance from various donors in the last few years and were therefore already well endowed with the type of technical assistance and organizational issues that were evaluated by the OCI tool. As it happens, the organizations that have received assistance in the past are the most willing to cooperate in such a test exercise expecting to benefit from the activities of a new program with a relatively large budget and a four- year span.

III. Final remarks

The baseline study has verified estimated baseline values for value and volume of sales of five target commodities using desk review, interviews, and direct observation. The baseline value for volume of sales is almost one-third larger than those stated in result indicator #8 of the EQS program (42,500 MT rather than 32,000 MT) while that for value of sales as in result indicator #7 are just slightly higher (US\$ 44.7 million rather than US\$ 44.0 million). An alternative baseline scenario has also been estimated, which takes into consideration the significant effect of the ban for exports of avocados and peppers to the U.S. market due to Medfly infestation – in case the ban stays on for 24 months or more. In this baseline scenario, volume sales are similar

and value sales are lower than those established in the EQS program performance monitoring plan (respectively 32,700 MT and US\$ 33.8 million).

The study has also collected data and information to establish baseline for how long it takes specific products to get through targeted problem points in the value chain using interviews, direct observation, and focus groups. Twelve problem points were identified and possible program activities suggested to overcome these problem points in a shorter period of time than without the program's technical assistance and/or financial support.

Five organizational capacity index (OCI) processes were completed to establish a baseline score for each of five target/pilot producer groups. These processes included conducting surveys of producer group senior management and participatory exercises involving producer group representatives and their members. The OCI tool was tested and some modifications to the original tool were incorporated to better fit the actual Dominican situation of the target commodity sectors. It is suggested to take the lowest of the cross sector ranking score as a starting point to evaluate program progress rather than the average OCI score.

Finally the study has provided return on investment thresholds and adaptable models for the purchasing of four technologies as part of the analytics related to product expansion. The return on investment of the following equipment has been performed: a) purchase of a ten 20 MT fermentation tanks for cocoa bean processing; b) purchase of cocoa powder drying sterilizing machine; c) purchase of a fruit and vegetable vacuum drying machine and vacuum conveyor dryer; and, d) purchase of an avocado processing line to get high quality oil. The analyzed technologies provide benefits in terms of increased productivity, enhancements in produce value-added, reduction of production and processing costs, and improvement of production and processing capacity (see report on technology ROI thresholds in Annex 3 to this baseline study).

Lessons learned include the following:

1. Personal connections and acquaintances by program deputy chief of party Teofilo Suriel were essential to establish contact with visited groups of producers and facilitate the meetings with relevant management staff and producers, especially for the five OCI processes;
2. Field visits were effective to provide a clearer idea of current actual activities of the organizations, which also included visits to packinghouses and to identify problems points while discussing with producers and executive management as well as in experiencing logistic problems in the transportation of the produce from certain production area to ports or consumption outlet (for instance poor road conditions, works in progress and occasional landslides that can disrupt the travel schedules);
3. Statistical data are not always reliable and should be handled accordingly. Published reports on market situation can be contradictory with a chapter saying something and the next one telling something else; and,
4. Getting information on cost of technology or on non-published information can be a frustrating process with no results to show. Hence, ad-hoc research on the web becomes an essential tool for getting needed information - when available.