

## Economic Impact of the Promotions (ROI)

To gain the best insight into the ROIs up to an ending season or year, a calculated impact for each year is based on the model estimates up to that ending year. The first column identifies the type of calculation while each additional column corresponds to the ending data period. The last column is labeled 2020 and thus indicates the models based on data ending in December 2020 while the row values are just for Jan-Dec of 2020. Note that the last row provides the ROIs for each year ending data points. For each row there is a “Yes” and “No,” indicating being aware or not aware of the mango promotions. All impacts of the NMB are the differences between the “Yes” and “No” for each row measurement. Changes across the columns (year endings) capture the impact of changes in all demand drivers and not just promotion.

Mango Promotion Awareness Models	Promotion	Base 2013: Mar to 2015:Dec	2016 Jan-Dec.	2017 Jan-Dec.	2018 Jan-Dec.	2019 Jan-Dec.	2020 Jan-Dec.	Cumulative 2013-2020
<b>Market Penetration</b>	Yes	0.073	0.134	0.154	0.136	0.164	0.199	
"	No	0.069	0.125	0.146	0.129	0.155	0.189	
<b>Market Intensity</b>	Yes	3.224	3.96	3.608	3.389	3.636	3.635	
"	No	3.056	3.656	3.398	3.211	3.407	3.402	
Avg. Retail Price (\$/mango)		1.19	1.34	1.37	1.28	1.36	1.38	
		-millions-	-millions-	-millions-	-millions-	-millions-	-millions-	sum
Household Mangos	Yes	2199	1773	1880	1523	1993	2426	11795
"	No	1970	1530	1673	1375	1762	2160	10470
Change in Mango Demand		229	243	208	148	231	266	1325
Household Expenditures	Yes	\$2,559.72	\$2,380.71	\$2,571.83	\$1,930.86	\$2,708.60	\$3,330.71	\$15,482.44
"	No	\$2,294.43	\$2,048.82	\$2,287.01	\$1,743.07	\$2,396.92	\$2,962.95	\$13,733.21
Gains FOB Equv. (34.07% Margin)	Yes	\$265.29	\$331.89	\$284.82	\$187.78	\$311.69	\$367.75	\$1,749.22
"	No	\$872.10	\$811.11	\$876.22	\$657.84	\$922.82	\$1,134.77	\$5,274.87
FOB \$ Difference	Yes	\$781.71	\$698.03	\$779.18	\$593.87	\$816.63	\$1,009.48	\$4,678.91
	No	\$90.38	\$113.07	\$97.04	\$63.98	\$106.19	\$125.29	\$595.96
NMB Expenditures	\$	\$17.57	\$6.59	\$6.12	\$6.87	\$7.90	\$6.63	\$51.68
Implied ROI		5.14	17.17	15.86	9.31	13.45	18.9	11.53

Market penetration changes from .073 to .199 over the full range of year endings. Without awareness of mango promotions, those market penetration values range from .069 to .189. Market intensities and average mango prices follow in the next two row descriptors.

Then using  $HWD \times Prob(MP) \times MI$  gives the retail level mangos and then retail value using the retail price per mango. Retail dollar gains are the difference attributed to the promotion awareness. As a general rule, FOB mango prices are close to 34% of the retail prices and that factor is used to express the retail gain at the equivalent FOB level. Those gains are noted as FOB \$ Difference.

NMB Expenditures includes the NMB expenditures for each reporting period, generally Jan-Dec except for the starting period from Mar-2013 through Dec-2015. While the gains are attributed to awareness, the costs to the NMB for achieving that awareness are those total

Board expenditures. Dividing the FOB \$ difference (with and without awareness) by those expenditures gives the ROIs. All gains depend on the effectiveness of the awareness along with actual retail prices. For 2020, the ROI is estimated to be 18.9 which is substantially higher than previous years. While 2020 was an unusual year with more at-home consumption, the market penetration was higher with and without awareness. That does suggest there was more chance for in-store promotion exposure, thus potentially contributing to some of the higher ROI.



Ronald Ward and Leo Ortega  
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**Driving the U.S. Demand for Mangos: The Impact of the National Mango Board**

Commodity generic promotions, what are they all about? Such programs have existed for decades and initially required state legislative or federal congressional approval depending on the scope of the program(s). With the enactment of the 1996 Commodity Promotion, Research and Information Order (ACT), national generic programs (or commonly referred to as “commodity checkoff programs”) could be implemented without congressional approval, but instead receive federal approval through the executive branch via the United States Department of Agriculture.

The National Mango Board (NMB) is one of those checkoff programs to receive approval through the 1996 enabling legislation and became effective on Nov. 3, 2004. With the establishment of the Mango Promotion, Research, and Information Order, first handlers and importers of 500,000 or more pounds of mangos will pay an initial assessment of ½ cent per pound on domestic and imported mangos to the NMB. That rate was later increased to ¾ cent per pound with all funds going to support maintenance, expansion, and development of domestic markets for fresh mangos. Given the authority to collect an assessment, the enabling legislation (ACT) required periodic evaluations of the programs using scientific methods for measuring the impact on demand for the commodity. That evaluation was completed for the Mango Board in 2021 and this trifold provides a summary of the NMB’s impact on the U.S. demand for mangos including an estimated Rate-of-Return attributed to the mango generic promotion programs.

This is a summary of a full report funded by the National Mango Board and completed by Dr. Ronald Ward, Emeritus Professor at the University of Florida and Dr. Leo Ortega, Research Director of the National Mango Board. A PDF version of the full report is available through the National Mango Board ([www.mango.org](http://www.mango.org)) or from Ward ([rward@ufl.edu](mailto:rward@ufl.edu)).

## Measuring Mango Demand

Retail demand is a product of the potential buyer base (*households*) times the percent of household buying (*market penetration*) times the number of mangos purchased in a buying occasion (*market intensity*). Demand drivers are those factors impacting *market penetration* and/or *market intensity*. A key to measuring demand is having information about the potential household buyers.

Early during the startup of the NMB, the board approved a program to collect monthly data about household food buying habits, including who did and did not buy mangos in a two-week shopping period. Those monthly data documented the demographics and many other characteristics of each survey respondent. Starting in 2013, questions about the shoppers' awareness of mango promotions were added to the survey. As of December 2021, the database included 177,006 observations recorded over months and across household respondents.

With the household data in place, a second step is to link demand back to those potential demand drivers and particularly, the impact of promotion awareness on the percent of households buying mangos and the number of mangos purchased in a shopping period. Those linkages are achieved through specifying statistical models and the resulting empirical/statistical relationships. The models establish that there are positive and statistically significant impacts on mango demand from both NMB expenditures on promotions and household awareness of promotions. NMB expenditures measure the boards program efforts while awareness documents household consciousness of the promotions. The next section shows those expenditures and awareness numbers.

While the models are technical, it is important to recognize two terms used throughout the report: Probit and Ordered Probit models. Probit models measure the demand drivers' (including promotions) impacts on the probability of buying mangos and the Ordered Probits measure the number of mangos purchased.

## Promotion Expenditures and Awareness

NMB collected \$83.6 million from 2007 through 2020. The large jump in 2013 is a result of the increased assessments in 2012. Collections of funds and the resulting expenditures would seldom be equal because of reserve requirements and the timing needs to implement different programs that do not parallel the assessments. Marketing accounted for about 61% of the total expenditure dollars followed with research at 20%.

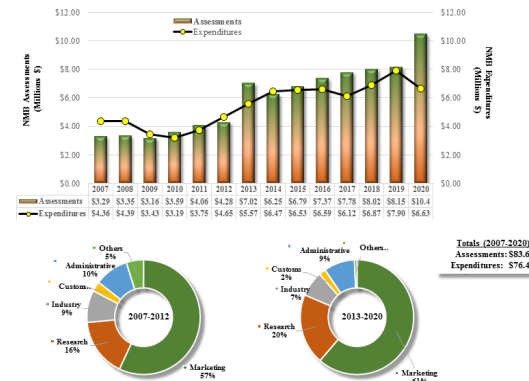
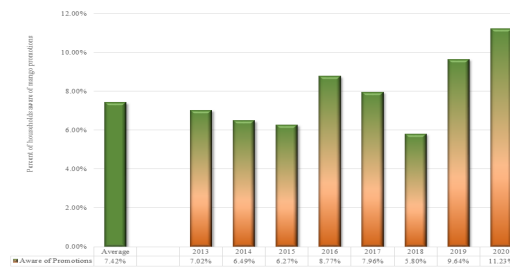


Figure 2 shows the annual awareness of the mango promotions starting with 2013, the first year the awareness data were collected. Note that in the models, the awareness is the Yes or No from each household while the expenditures are the monthly total assuming each household was equally exposed to the promotions.



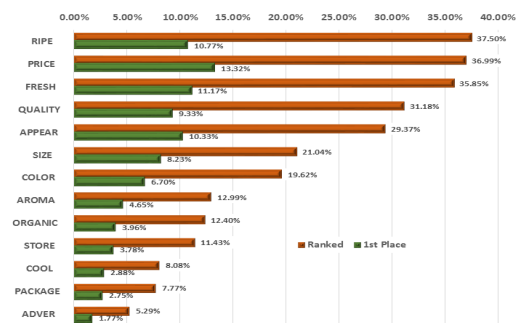
## Reasons for Buying Mangos

Each household shopper in the survey who bought mangos was asked to rank the 1st, 2nd, and 3rd reasons for buying mangos. Those rankings were included as a demand driver in the market intensity (number of mangos) model. This ranking could not be included in the market penetration since the question was for only mango buyers.

In Figure 3 below, the percent of buyers who ranked a reason with at least a 3rd place are shown with the orange bars while the green shows the first place. These bars show only the rankings and not the impact of the rankings. In the full report, the impacts of the ranking on demand are estimated. For almost every reason, the change in the number of mangos bought increases when the reasons are ranked.

In Figure 3, the reason bars are sorted from the most to the least ranked reasons with *ripeness* being the most ranked reason (37.5%). *Price* was a very close second. By groups, ripe, price, fresh, appearance, and quality had similar scores. Also, note the low rankings for County-of-origin (COOL), packaging, and advertising. Within the evaluations, promotions historically played a larger role in attracting shoppers to buy (*market penetration*) than on number of mangos per buyer (*market intensity*).

Figure 3



Reasons for not-buying were in the survey but not shown in this summary. Reasons for not-buying could not be included in the market penetration model since those reasons do not exist for mangos buyers.