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The Organic Sprout

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for Organic Producers

UNDERSTANDING MASS BALANCE:

MAINTAINING THE RECORDS

by Cheryl Wixson, Organic Marketing Consultant

As a math geek, my favorite part of the organic inspection process is the mass balance analysis. In a mass balance analysis, your records need to document that the input = output. So as a certified organic processor, my records need to demonstrate that our company purchased enough organic Principe Borghese tomatoes (input) to equal the amount of Jack's Organic Ketchup (output) that our company produced. Or as a certified organic farmer, my records need to demonstrate that I bought and planted the seed and harvested the amount of Winter Luxury pumpkin (input) to equal the amount of pumpkin (output) that was sold to the food-processing company.

When working with fresh produce like tomatoes, apples or squash, the mass balance analysis is usually done in pounds. For processors, the mass balance for items like spices and herbs are most often calculated in grams, with 454 grams equivalent to one pound. For certified organic farms, the record-keeping trail and analysis involves seed purchase records, planting and harvest records, and sales journals. Depending upon the farm management system, these may be individual logs, or records in a notebook. Regardless of the record format, the analysis is the same: a certain crop is evaluated from the beginning stages of seed or seedlings, all the way to harvest, sales and end use. Poor crop yields should be noted as a variance on your records,



and the corresponding sales should equal the amount harvested.

A good example of a crop fluctuation would be the comparison of apples. In the crop year 2011, on our farm, our records indicated that 65 bushels of apples were harvested from 17 trees. While this harvest amount may be considered lower than the average 10 bushels per tree, the orchard is being revitalized, and our records demonstrated that it was 3 times more than any of the prior years. In 2012, the orchard had a total crop failure and there was no harvest.

In performing a mass balance on the 2011 fruit harvest, an analysis was calculated on the input (65 bushels) and on the output: fruit pressed into cider, fruit sold to a food processor, and fruit put into livestock feed (rabbits).

Not having a scale on the farm, the estimate for the harvest mass was 40 pounds per bushel or 2620 pounds (input). On the output side of the equation, 600 pounds were sold to a food processor, 60 gallons of cider (12 – 5 gallon carboys) were fermented for sparkling cider or vinegar, and 60 gallons of cider were canned as juice. Cider house estimates are that 1 bushel or 40 pounds of apples yields 3 gallons of juice. Thus, on the output side, the cider equivalent of 1600 pounds of apples plus the 600 pounds sold equals 2200 pounds. While the 2620 pounds input does not equal 2200 pounds output, if the assumption was that the remaining 420 pounds were used as livestock feed, the records analysis do demonstrate a satisfactory mass balance.

As a processor, this analysis may become more complicated. For example, in the very nature of the (Continued on Pg 2)

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Understanding Mass Balance

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roasting process, coffee beans may lose up to 30% of their weight. Or in processing tomatoes to make a sauce, the skins and seeds are removed, and then the extract is boiled to remove water. Generally, 2.25 pounds of tomatoes are needed to make one pound of sauce. In cases like this, the processor needs to maintain detailed records that indicate these kinds of consistent losses and be able to demonstrate how these losses are part of the mass balance analysis. These records may be notes in a notebook, logs from processing or accounting records.

In addition, the processor needs to maintain sales records that demonstrate where and what quantity of product was sold, donated, or used in preparation for sampling. In all cases, to protect organic integrity, the final determination of mass balance must demonstrate that the input is equal to or greater than the output. Depending upon the size of operation, these records can take many forms. The simplest method may be a notebook, and the more detailed technique could involve formal accounting procedures like Quick Books. The bottom line remains the same, as your operation grows, the maintenance of these records becomes more critical, and is a key to your operation's financial success.

Cheryl Wixson, MOFGA's Organic Marketing Consultant, is always available to work with farms and processors on mass balance analysis. She can be reached at: cheryl@mofga.org.

