National Cranberry Cooperative (NCC) in North America

MBA 624

July 15, 2018

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National Cranberry Cooperative

Background

NCC is the largest cooperation and is found in almost all the major growth areas of cranberry in North America. It was put into place as a common facility by a group of farmers want to produce and marketplace the berries. The national cranberry harvest was very fruitful however there was a growing amount of surplus compared to what was used. An act then came into place to allow farmers to control the size of the crops.

The crops were harvested in two different ways, as water harvesting was increasing in popularity this method allowed to flood the bogs and collect quickly and easily the berries, resulting in 20 % more production than dry harvesting that was handpicked and inspected one by one, a long process. However, the fresh fruit process was less complicated than the process fruit, it went from receiving, to inspecting to packing and delivering. The process fruit process was a lot more elaborated, as you will see in the following pages. Which leads us to the problems that NCC is experiencing.

Analysis

This analysis will focus on the harvesting methods; wet and dry which affect the process and how for each piece affects everything else in the process. The advantages of having a cooperative for the farmers are to control and own, this helps them with getting supplies and with marketing techniques which leads to their goal: making money. They need to find a proper way of operating that will produce the biggest profit, so all parties are better off. Using the seven wastes will help categorize the problems and lean the process. In this case there is: waste of waiting time for trucks, a waste of processing the cranberries due to machines capacity, waste of overproduction causing delays and extra hours of labor and probably a waste of storage has wet-berries are increasing, and bagged bags may not be enough to store them.

The crops are their main resource and reason of operating. They need to balance demand and production, very important to understand the impact it has on the cooperative. If there are any surpluses as before the Act in 1937, surpluses are returned to farmers and that is considered to wastage. Wastage affects their profit margins results in a loss and the cranberry market can become too saturated driving demand down and ending up with surplus again. Here’s the process flow diagram to let us better understand what is going on at all levels of production. Producing cranberries is a continuous process, it produces large volumes and with low product variety. Adjustment is critical for RP1 as it deals with different volumes due to the seasonality of

the product. It’s generally important for the process to be simple and repetitive for each activity.

First step after trucks have arrived at the RP1 is to grade the berries by sampling a certain amount. The berries are graded from 1 being poor, to 2A, 2B or 3 being the best. However, this process is erroneous as mentioned earlier because first only a sample is taken out of the entire truckload then when the chief berry receiver grades the sample, if he’s not sure if the berries are No. 2B or No.3 he grades them to be No.3. For all berries graded No.3 a 0.50 cents premium was paid on 450 000 bbls. However, half berries from the sample that were claim to be of best quality weren’t. If 0.50 cents are paid for bbls and there’s a load of 450 000 bbls that means 225 000 $ premium and half of that cost is lost, 112,500 $.

They are running bad parts through the system instead of having them checked more carefully before it goes into the system, therefore time is wasted in addition to money. The grading also creates discrepancies between the growers that really deserve the premium and does who don’t because the water harvesting is less choosy when it comes to picking the cranberries compared to dry harvesting. If farmers know that the grading is done very lightly it might push the growers into picking out the cranberries either earlier or later after than due date to avoid crowding at RP1. By picking them out earlier the berries would not be of actual No.3 quality, resulting in less quality delivered therefore lower returns.

A second problem identified is how the temporary holding bins became too full and there was no space to receive more. Instead of taking 5-10 minutes for trucks to unload, some trucks sat idle for up to 3 hours. The volumes received are higher than what the bins can hold. The kiwanee dumping can be done at an average of 7.5 with an average truckload of 75 bbls therefore getting a capacity of 600 bbls/hr. If I take a peak day from exhibit 2, which consists of around 18 000 bbls in total deliveries than categorize them into wet and dry berries; I get 1050 bbl/hr for wet berries. I took 18 000 bbls; associated 70 % to wet berries for a total of 12600 and divided it by 12 hours because berries start arriving at 7:00 am all through the day till 7:00 pm.

The remaining 30 % are dry berries and they flow at a rate of 450 bbls/hr. From looking at figure E, the 27 holding bins are available starting at 7:00 am for berries to arrive but destone, deschaft, dry, separate and ship only begin at 11:00 am. Therefore in 4 hours, 4200 bbls (1050 x4) of wet berries and 1800 bbls (450 x4) arrive at the plant. The dry berries experience no problem, as the capacities of bins (1-16) are 4000 bbls therefore they have leftover space of 2200 bbls. But the same cannot be said for wet berries. Bins (17-24) can then give away the space reserved for dry to wet but even with all the bins (17-24) and (25-27) the maximum capacity is 3200 bbls and the wet berries received are 4200 bbls. An excess of 1000 bbls must then be kept on the trucks, which explains the long-wait time.

Following, at 11:00 am the dry berries start being processed at 600 bbls/hr (as determined previously) and that is faster than the 450 bbls that arrive hourly. The 4 hours of accumulated dry berries (1800 bbls) drop at a rate of 150 bbls/hr and drop to 600 when arrivals of trucks end. There is no problem of capacity as the intake is 4000 bbls for the bins. Dry berries might not encounter any problems at the first levels of the process however the bottleneck is at separating as we allocated 30 % of separating capacity to dry berries, 360 bbls (1200 x 30 %). For wet berries the processing time begins also at 11: 00 am at 600 bbls/hr and that is less than the rate of 1050 bbls that arrive hourly. Therefore, that causes the trucks to line up and wait as 450 bbls are left behind and cannot be processed. The green line demonstrates the capacity of the bins

(3200 bbls) that means that 3200 bbls are left in the bins and the rest in trucks from around 10 am to earlier in the morning.

RP1 does not only experience problems storing wet berries into the holding bins but also at the drying level. As we allocated 70 % of processing to wet berries we can see that the dumpers for wet berries have capacity of 2100 (3000 x 70 %) then move on to the bins where capacity is 3200. Then, follows dechafting with capacity of 315 (4500 x 70 %) followed by the bottleneck at drying with maximum capacity of 600 bbls as dry berries do not have to go through this step. Therefore, once more the process of unloading the trucks is slowed down due to the bottleneck at drying. Separating has a capacity of 840 bbls and shipping capacity of 2457 bbl.

Finally cost of labor is up. The major problem with absenteeism. Will Williston, the superintendent, has to put 20 workers on payroll to ensure that 15 will show up at work. Then, if we look at Figure E when trucks arrive at 7 am to unload the berries only the receiving workers are in place. There is no one there to begin: destone, dechaft and dry. If the process of dumpers is approximately a 5 -10-minute job then I don't see why no one is in place for following process. That slows the process downs, volumes of delivery accumulate because of it and overtime occurs per shift, as workers need to finish their task, causing extra bucks to the company.

When designing a new way of getting rid of constraints it is necessary to memorize that there are many factors that cannot be anticipated. We cannot predict exact crops first because there are external factors that influence the production that cannot be controlled humanly. As we see in the case in exhibit 2, the year 1970 had an average of 58 % of harvested water berries however we can see that the 58 % was not attained immediately at the start of the peak season in September. For year 1971, the wet-harvested berries are examined to increase to 70 %, therefore even if we increase in delivered wet berries by that additional 12 % to get to 70 %, the additional dryer that NCC wants to purchase may not be necessary.

Trucks are another additional variability as they don't have a specific arrival time or schedule of arrival in place. Whether absenteeism will occur or not, and how many staff members will be missing, is hard to predict also many of their workers are part of the union labor and policies can change at any time.

Action Plan

As we have learnt from reading "The Goal"; efficiency does not mean to produce as much as you can and build up inventory it's about operating at capacity level of the machines. Here I have a recommended a plan of action for the different constraints however the recommendations might change the system and improve it but it could be only for a very short period. It's important to keep in mind that new-implemented actions might carry their own problems afterwards.

Grading berries

Sampling each load of berries takes some time, as there is only one chief berry in place to grade the arriving trucks. Sampling is done poorly therefore to improve these two problems. I suggest farmers to assigned one of their employees to grade the berries (wet or dry) while

barrels are being load into trucks. Of course, it is impossible to grade each barrel accurately, but it will enable to grade more fairly as each barrel is inspected rather than one small sample from the truck. I would introduce a new scheme of colors and add a new category 2C for example, between 2B and 3, that will help grade the berries more accurately. Adding a 10 000 $ light meter which requires another killed operator will increase costs, something that NCC is trying to reduce.

Reduce waiting time

Cranberry season is usually found between September and December. And peak season according to exhibit 2 is between 19th September to end of October therefore why not extend the duration of the peak season so daily volumes are reduced. Large number of wet berries start to arrive only towards the end of September and continue all through the month of October but has 1971 is claim to have extra wet berries harvested then extending the peak season by a day or two will reduce inflow.

To accommodate more wet berries at the holding bin level I would suggest converting the temporary bins (17-24) into wet berries only. Then to take 1000 bbls, an equivalent of 4 bins from the temporary bins (1-16) as dry berries only need 1800 bbls of space and allocate it to the wet berries temporary bins. That will increase capacity to receive more wet berries therefore reducing waiting time of trucks.

When berries are placed in the held in the bins, I suggest you keep wet berries temporarily in the bins designed for dry and start processing them first. Like that trucks do not have to wait anymore.

One Kiwanee dumper could be allocated to dry berries only as dry berries only represent 30 % of the total quantity delivered. If you don’t assign one to dry berries, then the wet berries will take them all since their quantity is larger. Trucks delivering dry will then have to sit idle.

Bottlenecks for wet and dry berries

As noticed in the case wet berries do not have a long shelf life therefore they have to be processed quicker and it is preferable to be shipped in bulk in frozen bags. As the peak season increases the volumes of wet berries then berries should be dried only partially as they are changing to be frozen anyways. Therefore, wet berries can continue flowing to the drying process at its maximum of 600 bbls.

Removing the wet berries’ bottleneck will then enable to reduce the separating capacity of wet berries from 840 bbls 600 bbls. The difference of 240 bbls is then, given to the dry berries and increase their capacity of separating.

Working hours

To beginning processing the berries quicker rather than waiting 4 hours form 7 am to 11 pm, as receivers are busy unloading, RP1 should schedule the destone, dechaft and dry workers to come in an hour after 7 am. As we can see on, no wet berries were received at the plant until 459 time which is approximately 7 30 am. Therefore, an appropriate time to come in would be 8:

00 am to have a good accumulated amount of berries to begin the process, and workers should remain until shut down. That will reduce idleness of trucks.

The case gives no reason for why there is absenteeism, there from a management perspective it's important for the manager who schedule the workers to have a meeting with all workers both full time and temporary to see what the issues are, why are workers missing so much? Is it overtime? Is it lunch break? As manager you need to find out what will motivate the employees to increase efficiency at the plant.

For example, lunch break could take place while keeping wet berries processing at full capacity. By looking at Exhibit 1 we can assume that at time 671, which is approximately at noon trucks, will slow down for lunch. If trucks do not arrive anymore they done need for receivers and they can take the time to replace the ones in processing berries who need to take their lunch break.

Introducing two shifts instead of having overtime will relieve number of overtime workers work per day during peak season. That could motivate but if overtime is kept I would suggest paying the employees to the price of a full shift for the overtime.

Conclusion

As the case states, volumes for the year 1971 are said to resemble those of 1970 and wet harvesting is said to increase 20 % more than dry harvesting due to the increase method popularity. Therefore, to calculate the supply of daily volumes of process fruit for 1971, I would add 20 % to each volume to get an idea of what to expect. However, as the case demonstrates that peak days of 1970 have reduced the processing capability of RP1, as trucks were waiting a long time to unload, if they did have the capacity then the trucks would be able to return and get more crops to deliver. The recommendations that I made will increase capacity and improve some of the limitations mentioned earlier, some peak days might therefore see more than 20 % increase.