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# ACE Warehouse Receipts System Analysis

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# What is a Warehouse Receipt System?

## Definition:

- A warehouse receipt system is a platform that enables farmers, traders, processors and exporters to obtain finance secured by agricultural commodities deposited in a warehouse (Farm Risk Management For Africa, n.a).

# How does the ACE WRS work?

- A farmer, farmers' group/association, trader, processor or exporter deposits their agricultural commodity into warehouse.
- They are issued a negotiable warehouse receipt with the depositor's name, the warehouse's details and the commodity specifications (tonnage, moisture level, variety and grade).
- The warehouse receipt guarantees the quantity and quality of the commodity reflected allowing the warehouse receipt to be used as a form of portable collateral to request a loan from a financial institution.
- Loans offered by financial institutions are often at a percentage of the present total value of the receipt in order to help them hedge their risk. This is also referred to as haircut financing.

# How does the ACE WRS work?

- If a depositor takes out a loan, when prices are attractive for their commodity, they may decide to sell their warehouse receipt.
  - A contract is drawn up and the buyer of the warehouse receipt deposits funds into the warehouse receipt system provider's settlement account.
  - The warehouse receipt system provider settles the loan, storage costs and all other charges incurred and transfers the balance following the payments to the depositor.
- Ownership of the receipt is transferred to the buyer, who can either collect the commodity or request financing from the bank backed up by their new warehouse receipt.

# Results from ACE Warehouse Receipt System

## Background

- ACE started issuing WR in 2011
- Haircut financing was available from 2011 first as a pilot by ACE and then in 2014 was offered by 2 commercial banks and the Export Development Fund.
- Analysis focuses on 2011 to 2018 agricultural years during which 710 warehouse receipts were issued by ACE .
- 9 commodities (Beans, Cow Peas, Groundnuts, Maize, Pigeon Peas, Popcorn, Rice, Soybeans, Sunflower)
- AHCX's parallel WRS is not considered in our analysis

# WR issued by Commodity on ACE

| Commodity   | Total number of WRs issued | WR with financing | Total volume (MT) |
|-------------|----------------------------|-------------------|-------------------|
| Maize       | 464                        | 252               | 8429.4            |
| Soybeans    | 136                        | 63                | 2246.1            |
| Pigeon peas | 84                         | 52                | 1139.4            |
| Groundnuts  | 7                          | 0                 | 32.9              |
| Beans       | 8                          | 5                 | 87.2              |
| Cow Peas    | 6                          | 3                 | 34.9              |
| Rice        | 2                          | 2                 | 9.9               |
| Popcorn     | 1                          | 1                 | 0.5               |
| Sunflower   | 1                          | 0                 | 4.3               |

Source: Own calculations from ACE data (2011-2018)

Note: 16 WR issued for repayments of soybeans in 2017 under the ACE Chithumba model (which involves in kind repayments at harvest time for inputs) have been excluded from this analysis



# Who uses ACE Warehouse Receipts?

| Depositor Type                    | Number of WR | Maize | Pigeon Peas | Soybeans | Mean Storage Duration (days) | Total Volume (MT) |
|-----------------------------------|--------------|-------|-------------|----------|------------------------------|-------------------|
| <b>Farmers</b>                    | 136          | 90    | 10          | 35       | 199                          | 588.8             |
| <b>Farmer Associations/Groups</b> | 63           | 30    | 11          | 16       | 142                          | 597.4             |
| <b>Small Trader</b>               | 189          | 126   | 23          | 36       | 222                          | 1315.0            |
| <b>Medium Trader</b>              | 128          | 83    | 20          | 22       | 255                          | 1435.1            |
| <b>Large Trader/Processor</b>     | 194          | 135   | 20          | 28       | 300                          | 8048.3            |

Source: Own calculations from ACE data (2011-2018)



# Who uses ACE Warehouse Receipts?

| Commodity   | Multiple Depositor |        | One-off Depositor |        |
|-------------|--------------------|--------|-------------------|--------|
|             | Mean               | Median | Mean              | Median |
| Maize       | 23.8               | 12.2   | 12.5              | 5.1    |
| Soya        | 6.8                | 4.6    | 29.2              | 1.5    |
| Pigeon peas | 18.3               | 5.2    | 8.4               | 4.0    |

Source: Own calculations from ACE data (2011-2018)

# How did ACE WR holders fare?

Percentage Profit (Loss):

$$\frac{(\text{Sales value after storage} - (\text{Sales value before storage} + \text{Costs}))}{\text{Sales value of commodity before storage}}$$

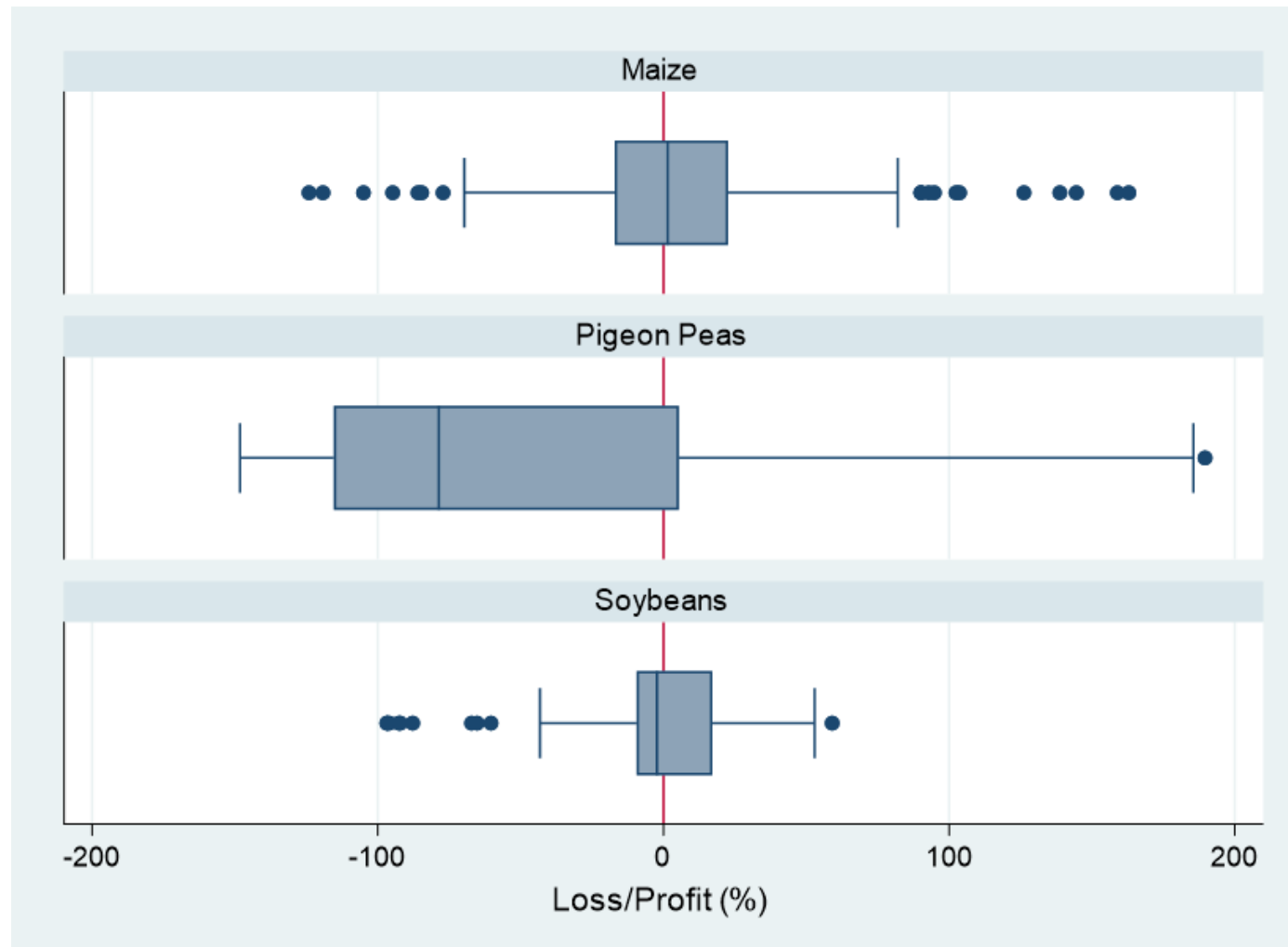
Note: Costs = Storage Costs + Financial Costs + Other Lien + ACE Commission

# How did ACE WR holders fare?

| Commodity          | Profits/Loss |        |         |        | Number of WR |
|--------------------|--------------|--------|---------|--------|--------------|
|                    | Mean         | Median | Min     | Max    |              |
| <b>Maize</b>       | 4.2%         | 1.5%   | -124.1% | 162.9% | 464          |
| <b>Pigeon Peas</b> | -43.9%       | -78.6% | -148.2% | 189.5% | 84           |
| <b>Soybeans</b>    | 0.0%         | -2.3%  | -96.8%  | 59.0%  | 137          |

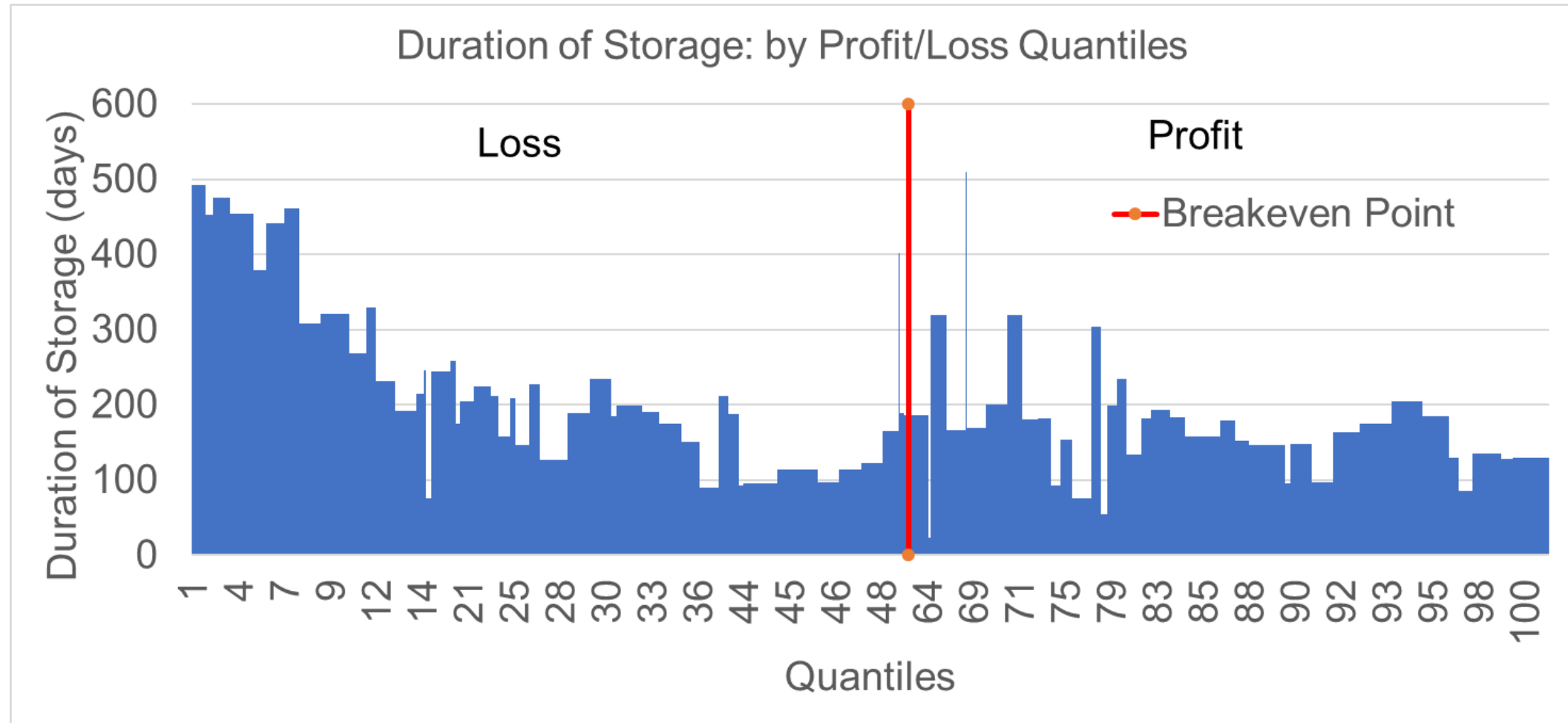
Note: authors calculations from ACE data, weighted by amount stored per WR

# How did ACE WR holders fare?



Note: authors construction from ACE data

# Impact of the duration of storage and financing on Profits/Losses



Source: Own calculations from ACE WR data, 2011 – 2018

# Impact of the duration of storage and financing

| Commodity                       | Number of WR | Profit/Loss |         | % of WR earning profits |
|---------------------------------|--------------|-------------|---------|-------------------------|
|                                 |              | Mean        | Median  |                         |
| <b><u>With Financing</u></b>    |              |             |         |                         |
| Maize                           | 270          | -7.4%       | -6.2%   | 54.4%                   |
| Pigeon Peas                     | 52           | -81.5%      | -115.8% | 21.2%                   |
| Soybeans                        | 63           | 6.5%        | 11.5%   | 63.5%                   |
| <b><u>Without Financing</u></b> |              |             |         |                         |
| Maize                           | 194          | 14.2%       | 5.6%    | 49.0%                   |
| Pigeon Peas                     | 32           | -7.8%       | -0.8%   | 37.5%                   |
| Soybeans                        | 73           | 0.1%        | 0.0%    | 32.9%                   |

Source: Own calculations from ACE WR data, 2011 – 2018

# Storage Rules: Maize

| With WR Financing |               |             |        |                          | Without WR Financing |             |        |                          |
|-------------------|---------------|-------------|--------|--------------------------|----------------------|-------------|--------|--------------------------|
| Storage Rules     | Number of WRs | Profit/Loss |        | % of WRs earning profits | Number of WRs        | Profit/Loss |        | % of WRs earning profits |
|                   |               | Mean        | Median |                          |                      | Mean        | Median |                          |
| From June to...   |               |             |        |                          |                      |             |        |                          |
| ...September      | 9             | -23%        | -44%   | 11%                      | 2                    | -49%        | -64%   | 0%                       |
| ...November       | 2             | 9%          | 2%     | 100%                     | 2                    | -3%         | -3%    | 0%                       |
| From July to...   |               |             |        |                          |                      |             |        |                          |
| ...December       | 18            | 3%          | 6%     | 44%                      | 5                    | -19%        | -27%   | 0%                       |
| ...January        | 17            | -17%        | -11%   | 59%                      | 2                    | -49%        | -39%   | 0%                       |
| ...March          | 5             | -1%         | 14%    | 80%                      | 6                    | -7%         | -16%   | 17%                      |
| From August to... |               |             |        |                          |                      |             |        |                          |
| ...December       | 15            | 24%         | 13%    | 67%                      | 3                    | 14%         | 12%    | 67%                      |
| ... January       | 52            | 20%         | 23%    | 96%                      | 6                    | 53%         | -21%   | 50%                      |
| ...March          | 4             | 7%          | 7%     | 75%                      | 9                    | 7%          | -31%   | 22%                      |

Source: Own calculations from ACE data (2011-2018)

# Storage Rules: Soybeans

| <b>With WR Financing</b>    |               |             |        |                          |
|-----------------------------|---------------|-------------|--------|--------------------------|
| Storage Rule                | Number of WRs | Profit/Loss |        | % of WRs earning profits |
|                             |               | Mean        | Median |                          |
| From May to...              |               |             |        |                          |
| ... <b>September</b>        | 11            | 13%         | 14%    | 73%                      |
| ... <b>October</b>          | 8             | 28.2%       | 26.9%  | 87.5%                    |
| From June to...             |               |             |        |                          |
| ... <b>September</b>        | 12            | 22.3%       | 20.9%  | 100.0%                   |
| ... <b>October</b>          | 4             | 41.0%       | 48.9%  | 100.0%                   |
| From July to...             |               |             |        |                          |
| ... <b>August</b>           | 0             | 0.0%        | 0.0%   | 0.0%                     |
| <b>Without WR Financing</b> |               |             |        |                          |
| <b>July...August</b>        | 22            | 2.4%        | -2.8%  | 18.2%                    |

Source: Own calculations from ACE data (2012-2018)



# Storage Rules: Pigeon Peas

| With WR Financing      |               |             |         |                          |
|------------------------|---------------|-------------|---------|--------------------------|
| Storage Rules          | Number of WRs | Profit/Loss |         | % of WRs earning profits |
|                        |               | Mean        | Median  |                          |
| From July to...        |               |             |         |                          |
| ...<br><b>November</b> | 9             | -123.6%     | -124.5% | 0%                       |
| From August to...      |               |             |         |                          |
| ... <b>November</b>    | 9             | -114.2%     | -115.1% | 0%                       |
| ... <b>December</b>    | 9             | -117.3%     | -116.1% | 0%                       |

Source: Own calculations from ACE data (2011-2018)



# Storage Rules: Hypothetical 50:50 Storage Rule for Farmers' Associations/Groups

| Scenario                         | Number of WRs | Profit/Loss |        | % of WRs earning profits |
|----------------------------------|---------------|-------------|--------|--------------------------|
|                                  |               | Mean        | Median |                          |
| <b>Hypothetical storage rule</b> | 21            | 12%         | 22%    | 81%                      |
| <b>With WRs Financing</b>        | 21            | -4%         | -7%    | 57%                      |

Source: Own calculations from ACE data (2011-2018)

# Summary and Conclusions

- ACE warehouse receipt system used 710 times: most receipts issued for maize, pigeon peas and soybeans.
- There is a negative relationship between the duration of storage and the returns that the depositor makes.
- Maize and soybeans stored for less than 180 days generally resulted in making a profit.
- Pigeon peas stored for less than 90 days and between 181 and 270 generally resulted in depositors making a profit.

# Summary and Conclusions

- 73 percent of warehouse receipts issued for pigeon peas made losses compared to 48 percent for maize and 53 percent for soybeans.
- Financing charges constitute a significant share of total costs, 57.1 percent.
- For warehouse receipts with financing, only soybeans made profits on average.
- For warehouse receipts without financing, both maize and soybeans made profits on average.
- Caveat: it has not been possible to conduct a similar analysis of WR issued by Malawi's other commodity exchange, AHCX

Thank You

# Possible Answers

| With WR Financing  |                 |                                 |                          |               | Without WR Financing |                                 |                          |               |
|--------------------|-----------------|---------------------------------|--------------------------|---------------|----------------------|---------------------------------|--------------------------|---------------|
| Commodity          | Year of Storage | Percentage Profit for Depositor | Total Volume Stored (MT) | Number of WRs |                      | Percentage Profit for Depositor | Total Volume Stored (MT) | Number of WRs |
| <b>Maize</b>       | 2011            | 15.5%                           | 98.3                     | 3             |                      | 78.2%                           | 4.1                      | 0             |
|                    | 2012            | 26.0%                           | 619.6                    | 57            |                      | 50.1%                           | 12.4                     | 2             |
|                    | 2013            | -24.4%                          | 1390.5                   | 38            |                      | 0.0%                            | 0.0                      | 1             |
|                    | 2014            | -5.4%                           | 3346.1                   | 99            |                      | 33.4%                           | 127.4                    |               |
|                    | 2015            | 45.6%                           | 205.7                    | 12            |                      | 61.2%                           | 216.8                    | 2             |
|                    | 2016            | -24.3%                          | 996.3                    | 60            |                      | 3.8%                            | 808.1                    | 1             |
|                    | 2017            | -6.1%                           | 4.8                      | 1             |                      | 7.8%                            | 526.6                    |               |
|                    | 2018            | 0.0%                            | 0.0                      | 0             |                      | -0.5%                           | 102.1                    | 2             |
|                    |                 |                                 |                          |               |                      |                                 |                          |               |
| <b>Pigeon Peas</b> | 2013            | 19.2%                           | 54.6                     | 2             |                      | 59.2%                           | 9.3                      |               |
|                    | 2014            | 1.7%                            | 32.3                     | 6             |                      | 13.6%                           | 8.8                      | 1             |
|                    | 2015            | 152.2%                          | 21.7                     | 7             |                      | 28.2%                           | 1.0                      | 1             |
|                    | 2016            | -105.3%                         | 558.2                    | 37            |                      | -9.9%                           | 452.0                    | 0             |
|                    | 2018            | 0.0%                            | 0.0                      | 0             |                      | 61.4%                           | 1.7                      | 20            |
|                    |                 |                                 |                          |               |                      |                                 |                          |               |
| <b>Soya</b>        | 2012            | -6.7%                           | 5.7                      | 1             |                      | 0.0%                            | 0.0                      | 100           |
|                    | 2014            | -0.5%                           | 12.6                     | 3             |                      | 0.0%                            | 1501.9                   | 47            |
|                    | 2015            | 20.3%                           | 286.1                    | 40            |                      | 20.7%                           | 6.8                      | 5             |
|                    | 2016            | -16.4%                          | 163.2                    | 20            |                      | -3.4%                           | 108.2                    |               |
|                    | 2017            | 0.0%                            | 0.0                      | 0             |                      | 3.0%                            | 161.4                    | 1             |
|                    | 2018            | 0.0%                            | 0.0                      | 0             |                      | -7.3%                           | 5.1                      | 4             |

# Possible Answers: Maize

| Duration (days)  | Number of WRs | Profit/Loss |         |
|------------------|---------------|-------------|---------|
|                  |               | Mean        | Median  |
| <b>&lt; 90</b>   | 101           | 12.85%      | 1.75%   |
| <b>91 - 180</b>  | 159           | 8.89%       | 13.68%  |
| <b>181 - 270</b> | 99            | -9.88%      | -18.02% |
| <b>271 - 360</b> | 25            | -18.10%     | -28.84% |
| <b>361 -450</b>  | 34            | -16.07%     | -21.50% |
| <b>451 - 540</b> | 38            | 2.10%       | -1.78%  |
| <b>541 - 630</b> | 7             | -63.09%     | -94.78% |
| <b>631 - 720</b> | 1             | 8.55%       | 8.55%   |

Source: Own calculations from ACE WR data, 2011-2018

# Possible Answers: Pigeon Peas

| Duration (days)  | Number of WRs | Profit/Loss |          |
|------------------|---------------|-------------|----------|
|                  |               | Mean        | Median   |
| <b>&lt; 90</b>   | 21            | 0.67%       | 4.43%    |
| <b>91 – 180</b>  | 12            | -15.18%     | -18.13%  |
| <b>181 - 270</b> | 4             | 18.58%      | 22.87%   |
| <b>271 - 360</b> | 1             | -100.36%    | -100.36% |
| <b>361 -450</b>  | 14            | -103.03%    | -115.51% |
| <b>451 - 540</b> | 30            | -118.94%    | -124.50% |
| <b>541 - 630</b> | 2             | -84.24%     | -83.61%  |
| <b>631 - 720</b> | 0             |             |          |

Source: Own calculations from ACE data (2011-2018)



# Possible Answers: Soybeans

| Duration (days)  | Number of receipts | Profit/Loss |         |
|------------------|--------------------|-------------|---------|
|                  |                    | Mean        | Median  |
| <b>&lt; 90</b>   | 62                 | 6.63%       | 9.48%   |
| <b>91 - 180</b>  | 46                 | 14.68%      | 16.87%  |
| <b>181 - 270</b> | 14                 | 0.67%       | -9.57%  |
| <b>271 - 360</b> | 2                  | -95.26%     | -96.82% |
| <b>361 -450</b>  | 10                 | -0.56%      | 0.00%   |
| <b>451 - 540</b> | 2                  | -77.58%     | -87.80% |
| <b>541 - 630</b> | 0                  |             |         |
| <b>631 - 720</b> | 0                  |             |         |

Source: Own calculations from ACE data (2011-2018)