# Assessment Of Post-Harvest Losses Management Practices Among Tomato Farmers In Ogo-Oluwa Local Government Area Of Oyo State

## ADEBAYO O.O, OYETOLA, B.T, OLANIYAN, A.O

Department of Agricultural Extension and Rural Development, Ladoke Akintola University of Technology, Ogbomosho, Oyo state, Nigeria.

*Abstract: The study investigated the assessment of post-harvest losses management practices among cassava farmers in Egbeda Local Government Area of Oyo State. Well-structure questionnaire was used with an interview schedule to obtain relevant information from 120 respondents. The respondents were selected through multi-stage sampling technique. The data for this study were analysed using both descriptive and inferential statistics. The descriptive statistics that were used include frequency counts, percentage, mean. The inferential statistics include Pearson product moment correlation (PPMC). The results of the findings of the study revealed that below average of the respondents were below 30 years of age and the mean age was calculated as 40. Majorities of the respondents were male and more than average of the respondents were married. Also, majorities of the respondents indicated the availability of information on post-harvest losses is mainly from family members, neighbors and friends. The findings also revealed that above average of the respondents indicated that they are faced with post-harvest losses challenges during processing stage which is due to insufficient processing machine, wastage that comes through processing etc. The major causes of post-harvest losses in cassava production as indicated by the respondents were inadequate finance and losses due to bad road network with a weighted mean score of 1.3 respectively. Majorities of the farmers in the study area indicated physical loss as the highest form of cassava post-harvest losses in cassava production in the study area. The result of the Pearson Product Moment Correlation shows that the selected socio economic characteristics such as age, sex, marital status, religion, educational level, years spent in school, farming experience, were insignificant. The study therefore recommends that to reduce cassava post-harvest losses, cassava processing must be introduced through conversion of cassava roots to different products that are market driven.*

Keywords; post-harvest, losses, cassava farmers, assessment

## 1. Introduction

Cassava is one of the mostly cultivated crops in Nigeria. It is generally cultivated on small land holdings in association with crops such as maize, groundnut, cowpea, vegetables and cocoyam depending on the agro-ecological zone and relies on residual soil nutrients when intercropped with maize which has been fertilized or has following crop in rotation with legume. Cassava crop is grown in 24 states out of 36states in Nigeria including the federal capital territory (FCT) (2). It does not only serve as food crop but more so as a major source of income for rural households. Nigeria has been known to be the largest producer of cassava in the world with an annual production of 60 million metric tons of tuberous root. Cassava ranks very high among crops that convert the greatest amount of solar energy into soluble carbohydrate per units of area. Among the starchy staples, cassava gives a carbohydrate requirement which is about 40% higher than rice and 25% more than maize, and is the cheapest source of calories for the both human nutrition and animal feeding(10). However, despites the numerous economic importance and nutritional factors of the crop, for the past two years' cassava production and post harvesting have been facing a lot of problems (1) reported that no supply chain structure exist for the commercialization and supplying of cassava products as primary source of raw materials for the agro-industries.

In Nigeria, 36% of food harvested is lost, equating to an average 167kg/cap per year where only 7kg is at the consumer level (7). The losses mainly occur at harvest 12.5%, 12.7% post-harvest, 4.5% processing and packaging, 4.6% distribution (5). Food losses take place at various stages in the food supply chain which include production, post-harvest, and processing (8). The distribution of losses across the value chain in developed economics differ from that in developing countries. In the latter, more losses occur towards the production stage while in the developed economics more losses occur towards the consumption stage. Substantial food occurs at the post-harvest stages; during marketing and processing in developing countries, food losses that occur at the end of the food chain (retail and final consumption) are better categorized as food waste, which relates to retailers and consumers behavior. The term food loss can refer to a loss of quantity and or quality; loss of quality requires objective evaluation while loss of quantity is measured in term of weight and volume, in most cases in the absence of appropriate standards and tools; loss of weight due to a nutritional quality of the food remain intact (3).

Evidence has shown that cassava post-harvest system such as processing, packaging marketing, storage, distribution, and transportation have constrained sustainable cassava production in recent times according to Rural Sector Enhancement Program

(9). In Nigeria, the major constraint associated with cassava production is the rapid post-harvest deterioration of its roots which usually hinders their storage in the fresh state for more than four days (10).

2.methodology

The research used multistage sampling technique for the selection of respondent which led to random selection of ten (10) cassava farmers from each of the selected villages to make a total of one hundred and twenty (120) cassava farmers that was used for this research work.

Data for this study was collected through the use of interview schedule/questionnaire for the respondents. Interview schedule was used for the respondents that are illiterate and questionnaire for the respondents that are literate. Both descriptive statistics and inferential tool were used for this study. Descriptive statistics used were frequency counts, percentages and mean which was used to analyze all the stated objectives. Inferential tool was used to analyze the stated hypotheses is Pearson Product Moment Correlation (PPMC).

## 3. RESULT AND DISCUSSION

3.1 Some selected Socio-economic characteristics of the respondents

About (41.7%) of the respondents were below 30 years of age, 36.7% were 31-50 years of age while 15.0% and 6.7% indicated they were between 51-70 and above 70 years of age respectively. The mean age of the cassava farmers is 40 years. This result implies that cassava farmers in the study area are matured, energetic and still in the productive years.

Majority (68.3%) of the cassava farmers were male with 31.7% female. This result is an indication that both sex engage in cassava production though with male participating more than female. This implies that cassava is a widely cultivated crop in the study area, hence the acceptability by both male and female.

Above average (59.2%) of the respondents indicated they are married, 6.7% indicated they are widowed while 6.7% and 27.5% indicated they are divorced and single respectively with mean household size of 6 members. Majority being married is expected to influence their disposition towards cassava post-harvest loss management practices as they will want to guide their production against losses which is expected to influence their income to aid their financial responsibilities in their various homes.

Few (30.8%) of the respondents indicated that they have Adult school qualification; 30.0% had tertiary education while 4.2% and 10.0% had no formal education and both completed and uncompleted primary education respectively, 25% of the respondents had both completed and uncompleted secondary education. This result is an indication that majority of cassava farmers in the study area are literate and this is expected to help in the assessment of cassava post-harvest losses management practices.

Majority (92.5%) of the respondents have farming as their primary occupation while 3.3% and 4.2% indicated civil service and trading as their primary occupation. This result is an indication that cassava farming is a widely accepted occupation in the study area.

Majority (75.8%) of the respondents have not more than 10 years of experience in cassava crop production, 20.8% indicated between 11-20 years while 0.8% indicated between 21-30 years, 0.8% and 1.7% indicated between 31-40 years and above 40 years of experience respectively in cassava farming with mean farm size cultivated for arable crop in the study area is 6.3 acres. The mean years of experience in cassava crop farming garnered by respondents from the study area is 8.5 years. Their level of experience is expected to have an influence on their post-harvest losses management practice as they are expected to specifically identify where severe constraints were encountered.

### 3.2 Sources of Information Available

The available source of information to the cassava farmers; 69.2% of the respondents indicated radio and television as a source of information available to them in the study area while 67.5% and 60.0% indicated the availability of information from extension services and social media respectively.
Furthermore, 64.2% and 65.0% indicated that they got their information through religion organization and farmers groups respectively. 65.8%, 58.3% and 49.2% of the respondents indicated mobile phone calls and sms, cooperative group, and E mail as the means of getting information. Lastly, majority (71.7%) of the respondents indicated the availability of information from family members, neighbors and friends.
This result generally implies that cassava farmers in the study area access information on post-harvest losses from various sources and this is expected to control, manage and guide against post-harvest loss among cassava farmers and this has effect on improving their productivity and livelihood. This finding tallies with that of (2) that educated farmers source information faster than uneducated

ones using information communication technology. Therefore, with improved awareness and knowledge acquisition, the sources of information frequently used by farmers would be more.

### 3.3 Type of Post-harvest Losses faced

The various type of post-harvest losses in cassava production revealed that 59.2% of the respondents indicated that the losses they face occurred during marketing of the harvested cassava. 63.3% and 65.8% of the respondents indicated that the post-harvest losses they are challenged with during harvesting and transportation stages respectively which can be likened to poor road, insufficient farm input for harvesting, fuel subsidy and insecurity.

Lastly, 62.5% of the respondents indicated that they are faced with post-harvest losses challenges during processing stage which is due to insufficient processing machine, wastages that come through processing, animal eating up flakes when drying, no improved facilities for processing.

This implies that food losses take place at various stages in the food supply chain, which is in accordance with (8) which states that substantial food occurs at the postharvest stages, during harvesting, transportation, marketing and processing in developing countries.

### 3.4 Causes of Post-harvest losses in Cassava Production

The causes of post-harvest losses in cassava production in as indicated by the respondents were; Inadequate finance (WMS=1.3) and losses due to bad road network (WMS=1.3) were ranked 1st as the major causes of cassava post-harvest losses as indicated by the respondents in the study area. Problem of marketing facilities (WMS=1.0) and Poor pricing at village level(WMS=1.0) were ranked 3rd. Bad weather, pest and disease infestation, inadequate storage facilities, inappropriate harvesting time, pilfering, cattle problem, inappropriate harvesting and inappropriate processing were all ranked 5th with each having a weighted mean score of 0.9.

In addition, varieties of cassava stem and delay in processing were ranked 13th with each having a weighted mean score of 0.8. Lastly, inadequate information on value additions was ranked 15th with a weighted mean score of 0.7.

This implies that the major causes of cassava post-harvest loss in the study area as indicated by respondents were inadequate finance and losses due to bad road network. Inadequate finance could affect the procurement of adequate storage, processing and marketing facilities and without these facilities; harvested roots might be exposed to pest and disease infestation causing physical deterioration of the roots and cassava products. Lack of good motorable road or bad road network could lead to the spoilage of the harvested cassava products and could as well delay the produce from reaching the final consumer. By implication, all the causes identified by cassava farmers were deemed serious, for instance, lack of finance /inadequate finance to process the cassava into more shelf stable products such as garri can lead to slow deterioration of the cassava tubers until it finally decays. This is a very serious post-harvest problem mostly found in the rural areas where money is a problem.

### 3.5 Forms of Cassava Post-harvest Losses in Cassava Production

The result of the findings revealed that physical loss was 70.0%, followed by economic loss (57.5%) and monetary loss (64.2%). Thus, cassava farmers in the study area experienced losses in different forms. These forms were in line with FAO (4) recently adopted forms. (4) physical loss occurs when fresh/processed cassava products are damaged to the point that they have to be thrown away at all stages of the value chain. This could be a result of poor maturation, poor processing techniques, climate change, diseases/pest attacks and poor storage among others resulting in loss both in weight and quality. Also, economic losses refer to products that have incurred quality deterioration to the point that either their market price is discounted or cannot be used for what they were initially meant for; it can be converted to alternative uses.

In monetary loss, it refers to financial loss due to either physical or economic losses including the stolen roots. With a high percentage recorded, it implies that the majority of cassava farmers in the study area experienced these losses at one period or the other.

### 3.6 Management Practices Measure taken by Cassava Farmers against Post -harvest          loss

The result of the findings revealed the management practices measure taken against post-harvest losses in cassava production in the study area. Those that assembled immediately after harvested were ranked 1st with a weighted mean score of 3.1. Those that cut stem and leave roots in the soil and those that transport it immediately to nearest market were ranked 2nd respectively with each having a weighted mean score of 2.9. In addition, those that processed immediately into Garri (WMS=2.7), Lafun (WMS=2.6), Fufu (WMS=2.5), Starch (WMS=2.2), Chips (WMS=2.1) and Tapioca (WMS=1.9) were ranked 4th, 5th, 6th, 8th, 9th and 10th respectively. Those that market the value additions immediately after processing were ranked 7th with weighted mean score of 2.3. This shows that majority of the respondents assembled immediately after they have harvested as management practices measure against cassava post-harvest loss in the study area. By implications, with better economic advantage especially in the area of cassava processing techniques, post-harvest losses reduced and the quality of cassava products improved through value addition. This tallies with the work of (6), that post-harvest value addition and technology helped to reduce waste.

### 3.7 Constraints Encountered by Cassava Farmers

The constraints encountered by cassava farmers indicated that inadequate capital to purchase storage facilities was ranked 1st with weighted mean score of 1.4. This affirmed that inadequate capital to purchase storage facilities is a very serious problem faced by cassava farmers in the study area, an indication that availability of capital might curb post-harvest losses in the study area.

Moreover, bad road networking and lack of efficient transport system, and animal attacks were ranked 2nd with each having weighted mean score of 1.3. Pilfering (WMS=1.2) was ranked 4th. Deterioration of roots (WMS=1.1), inadequate processing facilities (WMS=1.1), inadequate access to markets (WMS=1.1), and poor power supply (WMS=1.1) were ranked 5th. Lastly, glut in market (WMS=0.9) and inadequate storage facilities (WMS=0.9) were ranked 9th respectively.

Generally, this implies that the major constraint that the respondents faced in the study area was inadequate capital to purchase storage facilities and prove (10) wrong which state that the major constraint associated with cassava production is the rapid post-harvest deterioration of its roots.

### 3.8 Test for Hypothesis

The hypothesis was stated as follows;

Ho: There is no significant relationship between the socio-economics characteristics of the respondents and post-harvest loss management.

The result of the Pearson product moment correlation revealed that household size and farm size were significant at 5% and 10% level of significance respectively ($r=-0.198$, $p<0.030$) and ($r=-0.276$, $p<0.002$). This implies that there is significant relationship between the household size and farm size of the respondents and post-harvest loss management practices. This indicates that the higher the household size the more the respondents utilized the post-harvest loss management practices. Also, the lesser the farm size cultivated, the higher the chance they have to utilize post-harvest loss management practices. Hence, the null hypothesis is rejected.

**Table 1: Distribution of Respondents by Socio-Economic Characteristics**

| Variables | Frequency | Percentage (%) | Mean |
|---|---|---|---|
| **Age (years)** | | | |
| ≤ 30 | 50 | 41.7 | 39.9 |
| 31-50 | 44 | 36.7 | |
| 51-70 | 18 | 15.0 | |
| Above 70 | 8 | 6.7 | |
| **Sex** | | | |
| Male | 82 | 68.3 | |
| Female | 38 | 31.7 | |
| **Marital status** | | | |
| Married | 71 | 59.2 | |
| Single | 31 | 27.5 | |
| Divorced | 8 | 6.7 | |
| Widowed | 8 | 6.7 | |
| **Household size** | | | |
| ≤ 3 | 15 | 12.6 | 6.0 |
| 4-6 | 65 | 54.2 | |
| 7-9 | 31 | 25.8 | |
| Above 9 | 9 | 7.5 | |
| **Educational level** | | | |
| Adult Education | 37 | 30.8 | |
| Non formal | 5 | 4.2 | |
| Primary (completed) | 7 | 5.8 | |
| Primary (uncompleted) | 5 | 4.2 | |
| Secondary (completed) | 5 | 4.2 | |
| Secondary (uncompleted) | 25 | 20.8 | |
| Tertiary | 36 | 30.0 | |
| **Occupation** | | | |
| Farming | 111 | 92.5 | |
| Trading | 5 | 4.2 | |
| Civil servant | 4 | 3.3 | |
| **Farm size** | | | |
| ≤10 | 108 | 90.0 | 6.3 |

| | | | |
|---|---|---|---|
| 11-20 | 6 | 5.0 | |
| 21-30 | 5 | 4.2 | |
| Above 30 | 1 | 0.8 | |
| **Farming Experience** | | | |
| ≤ 10 | 91 | 75.8 | 8.5 |
| 11-20 | 25 | 20.8 | |
| 21-30 | 1 | 0.8 | |
| 31-40 | 1 | 0.8 | |
| Above 40 | 2 | 1.7 | |

Source: Field survey, 2024

**Table 2: Distribution of Respondents According to Sources of Information Available in the Study Area.**

| S/N | Sources of Information on Post-harvest Losses | *Frequency | Percentage |
|---|---|---|---|
| a. | Extension services | 81 | 67.5 |
| b. | Social Media/Internet | 72 | 60.0 |
| c. | Religion organization | 77 | 64.2 |
| d. | Farmers group | 78 | 65.0 |
| e. | Mobile phone calls / SMS | 79 | 65.8 |
| f. | Cooperative groups | 70 | 58.3 |
| g. | E-mail | 59 | 49.2 |
| h. | Television/ Radio | 83 | 69.2 |
| i. | Family members/Neighbors/ Friends | 86 | 71.7 |

Source: Field survey, 2024.

*: Multiple responses

**Table 3: Distribution of Respondents According to the Type of Post -harvest losses faced in the Study Area**

| S/N | Type of Loss | *Frequency | Percentage |
|---|---|---|---|
| a. | During Marketing stage | 71 | 59.2 |
| b. | During Harvesting stage | 76 | 63.3 |
| c. | During Transportation stage | 79 | 65.8 |
| d. | During Processing stage | 75 | 62.5 |

Source: Field survey, 2024.

*: Multiple responses

**Table 4: Distribution of Respondents according to causes of Post-harvest Losses in Cassava Production**

| S/N | Causes of Post-harvest Losses | Major cause F(%) | Minor cause F(%) | Rarely a cause F(%) | WMS | Rank |
|---|---|---|---|---|---|---|
| a. | Inadequate Finance | 57(47.5) | 41(34.2) | 22(18.3) | 1.3 | 1st |
| b. | Problem of marketing facilities | 31(25.8) | 62(51.7) | 27(22.5) | 1.0 | 3rd |
| c. | Bad weather | 32(26.7) | 48(40.0) | 40(33.3) | 0.9 | 5th |
| d. | Inadequate information on value addition | 26(21.7) | 33(27.5) | 61(50.8) | 0.7 | 15th |
| e. | Pest and disease infestation | 29(24.2) | 46(38.3) | 45(37.5) | 0.9 | 5th |

| S/N | | Always/col1 | col2 | col3 | WMS | Rank |
|-----|-----------------------|-------------|-------------|-------------|-----|------|
| f. | Losses due to bad road network | 51(42.5) | 51(42.5) | 18(15.0) | 1.3 | 1st |
| g. | Inadequate storage facilities | 36(30.0) | 41(34.2) | 43(35.8) | 0.9 | 5th |
| h. | Inappropriate harvesting time | 30(25.0) | 45(37.5) | 45(37.5) | 0.9 | 5th |
| i. | Pilfering | 31(25.8) | 56(46.7) | 33(27.5) | 0.9 | 5th |
| j. | Cattle problem | 32(26.7) | 42(35.0) | 46(38.3) | 0.9 | 5th |
| k. | Varieties of cassava stem | 27(22.5) | 43(35.8) | 50(41.7) | 0.8 | 13th |
| l. | Poor pricing at village level | 38(31.7) | 46(38.3) | 36(30.0) | 1.0 | 3rd |
| m. | Inappropriate harvesting | 34(28.3) | 42(35.0) | 44(36.7) | 0.9 | 5th |
| n. | Inappropriate processing | 28(23.3) | 51(42.5) | 41(34.2) | 0.9 | 5th |
| o. | Delay in processing | 30(25.0) | 40(33.3) | 50(41.7) | 0.8 | 13th |

Source: Field survey, 2024
F= Frequency, %= Percentage, WMS= Weighted mean score

**Table5: Distribution of respondents according to the Forms of Cassava Post-harvest Losses in cassava production in the study area**

| S/N | Forms of Post-harvest Losses | *Frequency | Percentage |
|-----|------------------------------|------------|------------|
| a. | Physical loss (damaged and thrown out roots/processed products) | 84 | 70.0 |
| b. | Economic loss (quality deteriorated roots with lower alternative uses) | 69 | 57.5 |
| c. | Monetary loss (financial loss in both physical and economic loss including stolen roots) | 77 | 64.2 |

Source: Field survey, 2024.
*: Multiple responses

**Table 4.6: Distribution of Respondents According the Management Practices Measure taken by Cassava Farmers against Post- harvest Loss in the Study Area.**

| S/N | Post-harvest losses management practices | Always F(%) | Frequent F(%) | Sometimes F(%) | Rarely F(%) | Never F(%) | WMS | Rank |
|-----|------------------------------------------|-------------|---------------|----------------|-------------|------------|-----|------|
| a. | Cut stem and leave roots in the soil | 40(33.3) | 46(38.3) | 24(20.0) | 9(7.5) | 1(0.8) | 2.9 | 2nd |
| b. | Assembled immediately after harvested | 42(35.0) | 48(40.0) | 27(22.5) | 2(1.7) | 1(0.8) | 3.1 | 1st |
| c. | Transportation to nearest market | 36(30.0) | 45(37.5) | 30(25.0) | 7(5.8) | 2(1.7) | 2.9 | 2nd |
| d. | Processed immediately into garri | 37(30.8) | 39(32.5) | 26(21.7) | 12(10.0) | 6(5.0) | 2.7 | 4th |
| e. | Processed immediately into fufu | 25(20.8) | 39(32.5) | 35(29.2) | 8(6.7) | 13(10.8) | 2.5 | 6th |
| f. | Processed immediately into chips | 18(15.0) | 33(27.5) | 31(25.8) | 18(15.0) | 20(16.7) | 2.1 | 9th |
| g. | Processed immediately into Tapioca (cassava flakes) | 16(13.3) | 33(27.5) | 29(24.2) | 13(10.8) | 29(24.2) | 1.9 | 10th |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| h. | Processed immediately into Lafun | 31(25.8) | 32(26.7) | 38(31.7) | 12(10.0) | 7(5.8) | 2.6 | 5th |
| i. | Processed immediately into Starch | 20(16.7) | 39(32.5) | 29(24.2) | 9(7.5) | 23(19.2) | 2.2 | 8th |
| j. | Marketing of the value additions immediately after processing. | 21(17.5) | 35(29.2) | 34(28.3) | 16(13.3) | 14(11.7) | 2.3 | 7th |

Source: Field survey, 2024
F= Frequency, %= Percentage, WMS= Weighted mean score

**Table 7 : Distribution of Respondents According to Constraints Encountered by Cassava Farmers in the Study Area.**

Source: Field survey, 2024
F=

| S/N | Constraints | Very Serious F(%) | Serious F(%) | Not a constraint F(%) | WMS | Ranking |
|---|---|---|---|---|---|---|
| a. | Inadequate capital to purchase storage facilities | 59(49.2) | 45(37.5) | 16(13.3) | 1.4 | 1st |
| b. | Bad road network/Lack of efficient transport system | 48(40.0) | 61(50.8) | 11(9.2) | 1.3 | 2nd |
| c. | Deterioration of roots | 38(31.7) | 58(48.3) | 24(20.0) | 1.1 | 5th |
| d. | Animal attacks | 42(35.0) | 67(55.8) | 11(9.2) | 1.3 | 2nd |
| e. | Pilfering | 45(37.5) | 49(40.8) | 26(21.7) | 1.2 | 4th |
| f. | Inadequate processing facilities | 39(32.5) | 50(41.7) | 31(25.8) | 1.1 | 5th |
| g. | Inadequate access to markets | 35(29.2) | 56(46.7) | 29(24.2) | 1.1 | 5th |
| h. | Glut in market | 31(25.8) | 57(47.5) | 32(26.7) | 0.9 | 9th |
| i. | Inadequate storage facilities | 33(27.5) | 52(43.3) | 35(29.2) | 0.9 | 9th |
| j. | Poor power supply | 44(36.7) | 48(40.0) | 28(23.3) | 1.1 | 5th |

Frequency, %= Percentage, WMS= Weighted mean score

**Table 8: Relationship between the socio-economics characteristics of the respondents and Post-harvest Loss Management Practice**

| Socio-economics characteristics | Correlation ( r) | P-value | Decision | Remarks |
|---|---|---|---|---|
| Age | 0.084 | 0.360 | NS | Accept |
| Household size | -0.198* | 0.030 | S | Reject |
| Years spent in school | -0.039 | 0.672 | NS | Accept |
| Farm size | -0.276** | 0.002 | S | Reject |
| Farming Experience | 0.100 | 0.279 | NS | Accept |

Source: Computed data, 2024

* Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level
NS: Not significant S: Significant

4. **Conclusion and recommendation**

Based on the results from the study, it was concluded that the cassava farmers in the study area have utilized management practices against their post-harvest loss challenges, and they have adequate information about the crop and its post-harvest activities. Losses have adverse effect on socio economic wellbeing of the respondents as it leads to a reduction in their income where majority finds it difficult to assess quality health care, nutritious food, housing, clothing, education and other basic needs of life.

The following recommendations were made based on the findings of the study

- An enlightenment programme on value additions that are market driven should be organized by stakeholders.
- Stakeholders should consider those factor influencing post-harvest losses under production, and adapt it to curb post-harvest losses where necessary.
- Establishment of agro-allied industries that can take care of processing fresh cassava into finished products.

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