

Issues and Challenges in Production Process of Grain Processing Units- An Empirical Study in Selected Districts of West Bengal

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Abstract

India ranks second position in production of 'total grains', next to China. West Bengal is the leading rice producer. The expansion and diversification of the food processing industry depend heavily on the growth of grain processing units. Majority of the grain processing units face challenges related to raw materials, workers and production process. The study has tried to highlight the major constraints of the grain processing units of West Bengal through primary survey. The study also offered suggestions concerning how to enhance this industry in the future.

Keywords: Grain processing, challenges, rice mills, production process, raw materials, workers

1. Introduction

Green revolution has contributed a lot to the progress of Indian agriculture and to achieve food and grain self-sufficiency. There are a lot of grain processing enterprises across the nations to prevent grain waste and employment generation. Agriculture and the industry were connected via the food processing sector (Venkatesh et al., 2017). The three types of grains i.e. paddy, wheat and pulses, are mainly produced in India. China is the largest producer of paddy and wheat, but India is the leading producer of pulses. India ranks second position in production of 'total grains', next to China. West Bengal is the leading rice producer. Uttar Pradesh is the leading wheat producer and Rajasthan is the leading pulse producer in India (Ministry of Agriculture & Farmers Welfare, 2021). In grain processing units production related challenges are issues of concern. A large number of rice mills failed to adopt modernization (Singha, 2013). Procurement, processing, distribution and retailing of rice i.e. supply chain management is another big issue of concern to the rice mills (Sharma et al., 2013). Structural and managerial issues are also notable in rice mills (Bharti et al., 2002). The study has attempted to pinpoint the production related difficulties facing the grain mills in West Bengal and has offered potential solutions.

2. Review of Literature

Nayak (1996) has conducted the study in the district of Midnapur of West Bengal. He mentioned the normal and abnormal paddy loss in rice mills, the problem with parboiling and drying, and the problem with by-products as the three main issues. He stated that although the rice mills in those districts were aware of modernization, the bulk of them had not yet changed due to issues with finances, power, and marketing facilities. Bharti et al. (2002) have tried to identify the challenges in rice mills. They

emphasised three different categories of issues: technical issues, structural issues, and managerial issues. They also recommended potential solutions to deal with these concerns, such as quality improvement to address technical issues, structural reorganisation to address organisational challenges, and technical staff training to address managerial challenges. Additionally, they indicated that rice mills require assistance to increase the production of high-quality rice and meet both domestic and international demand. **Sekhoni et al.** (2003) has tried to identify the challenges of rice processing units in Punjab and suggested suitable remedies in their study. They observed that during the seventies and eighties growth rate was high for rice mills in Punjab but it slow down during the nineties due to stagnation in the production of rice. Major challenges of the rice mills were poor quality of paddy due to higher moisture content, delay in announcement of levy price by the Central government, etc. They also suggested setting up integrated rice mills to ensure better quality. **Dev and Rao** (2004) conducted their study in Andhra Pradesh to evaluate the opportunities and challenges of the food processing industry. According to their investigation, there are certain benefits, including high raw material production, affordable labour, manpower, etc. But the business has a lot of issues, and to deal with them, the government must step in. In their study, they made five policy recommendations, grouped into five categories: institutional, taxes and subsidies, research and training, infrastructure, and other ideas. **Shehrawat** (2006) has highlighted that quality management was the most significant area of the entrepreneurs' training. It implies that superior quality product is very helpful in increasing demand and getting a higher sell price in comparison to poor quality products. Marketing management, packaging techniques for export and marketing techniques were the other important areas. **Singha** (2013) has stated that the conversion ratio of paddy is lower in traditional rice mills than the modern rice mills. He recommended upgrading the traditional (huller) mills to advance techniques for improvement in milling ratio. He also concluded that it will help to reduce post-harvest loss and food security challenges in India. **Singh** (2014) has concluded that the food processing sector has the potential to change the socio-economic conditions of rural India. He added that a strong and thriving food processing industry can significantly improve the agricultural sector by expanding opportunities for value-added products and creating surpluses of agro-food products for export. However, this requires policies and plans to upgrade the infrastructure of the food processing industry, including upgrading technology, enforcing quality standards, and encouraging investment in the industry. **Sarkar and Maji** (2016) have observed that a new trend that calls for more processed food has emerged as a result of shifting demographics, socioeconomic situations, and increased urbanization. So, there is a lot of room for future growth in the food processing industry. Additionally, they concluded that the Hooghly district possesses nearly all of the favourable factors for this industry. The Government and private sectors have to work closely together to give the industry the attention it needs to grow because it can both meet changing consumer demand and take action to relieve pressure on farmers. **Shanthini and Nallathambi** (2020) have stated in their study that very few rice mills of Srivaikundam Taluk have adopted modernization and the majority of the rice mills yet not adopted modernization due to economic challenges, power or electricity challenges. They also mentioned that the respondents accepted the importance of modernization of rice mills and they also agreed that if they get financial assistance from the government they will convert their rice mills into modern rice mills. They also suggested the government help the rice mills in this regard. **Hazra and Santra** (2021) have observed in their study that the economy of the village depends on rice mills. A large number of people in the village earn their livelihood from these rice mills. Paddy farmers earn a livelihood by supplying paddy to these rice mills either directly or through intermediaries. The development of rice mills depends on the supply of paddy in the market and the demand for rice in the market. The middlemen control the supply of paddy or the demand for rice in the market. They have suggested that to protect rice mills, dependence on middlemen should be reduced and the government should help rice mills in this regard.

3. Objectives of the study

The major objectives of the study are:

- (i) To examine the issues and challenges related to raw material and workers of grain processing units in West Bengal.
- (ii) To evaluate production process of the grain processing units.
- (iii) To identify the factors contributing to the challenges of production process of grain processing units.

4. Research Methodology

The study is both exploratory and empirical in nature. The explorative part of the study is based on the existing literature on the subject including books, journal articles, and reports of Ministry of Food Processing, Ministry of Agriculture and Farmer Welfare (MFAW). The empirical analysis has been done on the basis of both secondary and primary data.

The primary data has been collected through the primary survey, which has been conducted in six selected districts namely, North 24 Parganas, South 24 Parganas, Nadia, Hooghly, Burdwan and Kolkata. These districts were selected based on a higher concentration of food processing units. Total 105 food processing units were selected for the survey. Non-probabilistic convenience sampling techniques have been used in the selection of the food processing units.

A structured questionnaire has been prepared regarding production related issues like raw materials, workers and machinery and process of production, etc. The questionnaire has been filled up through direct interaction with the respondents, who were the owner of the units. Cronbach's Alpha was used to test the internal consistency of the questionnaire, the result of which was found to be 0.738. It has shown the sub-category and district-wise selected food processing units in table-1:

Table 1: Sub-category and District wise Selected Food Processing Units in West Bengal

Type of Industry	North 24 Parganas	South 24 Parganas	Nadia	Hooghly	Kolkata	Burdwan	Total
Rice mills	07	10	15	10	00	20	62
Pulse/ Dal Mill	03	00	00	01	20	00	24
Wheat mill	03	04	05	06	01	00	19
Total	13	14	20	17	21	20	105

Source: Compiled by the researcher

The SPSS software has been used in this study for analyzing the data of primary survey. Simple percentages, pie chart, bar chart and categorical variable tables have been used to present and interpret the data. Descriptive statistical tools, Chi-Square Tests have conducted to check the association between the variables and Principal Component Analysis (PCA) has been conducted to identify the most challenging factors in production process.

Exhibit: 1 Hypotheses Formulated

Hypotheses 1	H ₀ : There is no association between fluctuation in price of raw materials and role of middleman in determination of price.
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Hypotheses 2	H ₀ : There is no association between quality of raw materials and disruption in production of the units.
Hypotheses 3	H ₀ : There is no association between workers migration and availability of permanent workers.
Hypotheses 4	H ₀ : There is no association between training of workers and production of export quality food products.
Hypotheses 5	H ₀ : There is no association between use of machineries and technologies and wastage of raw materials.

Source: Compiled by the researchers

5. Results and Discussion

The researcher has divided this section into three parts i.e. (a) Demographic profile of the respondents, (b) Business profile of the respondents and (c) Production related challenges faced by the Grain Processing Units of West Bengal. These three sections have been discussed below:

Demographic Profile of the Respondents

In this section, the demographic profile of the respondents have been explained. The researcher has tried to know the ratio of male and female entrepreneurs, their caste, educational qualifications and any other special degree if they have. It has shown in the table-2:

Table 2: Demographic Profile of the Respondents

Demographic Variable		Frequency	Percentage
Gender	Male	97	92.4
	Female	8	7.6
	Total	105	100.0
Caste	Gen	76	72.4
	SC	17	16.2
	OBC-A	2	1.9
	OBC-B	10	9.5
	Total	105	100.0
Educational Qualification	Literate	6	5.7
	Primary	6	5.7
	Secondary	8	7.6
	H.S	31	29.5
	UG	47	44.8
	PG	7	6.7
	Total	105	100.0
Specialized Degree	Diploma Course	2	1.9
	No	103	98.1

	Total	105	100.0
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Source: Compiled by the researchers

Majority of the respondents (92.40%) were male of grain processing industries and 7.60% were female, which is also noticeable. Majority of the respondents (72.40%) belong from general caste and only 1.9% are belong from Other Backward Class-A (OBC-A) category. No respondent is from ST category.

A good trend has observed that most of the respondents are highly qualified. 44.80% respondents are Under Graduate (UG) and 29.50% respondents are Higher Secondary qualified and 5.70% are only literate. 98.10% of respondents have no special qualification and only 1.90% respondents have special degree.

Business Profile of the Respondents Units

In this section the researcher has tried to know involvement of the respondents with their units and how long they are in this business. Table: 3 has shown this.

Table: 3 Business Profile of the Respondent Units

Business Variable		Frequency	Percentage
Involvement with the Unit	Inherited	40	38.1
	Formed by myself	55	52.4
	Purchased	10	9.5
	Total	105	100.0
Experience in this industry	Less than 5 Years	2	1.9
	6-10 years	18	17.1
	More than 10 Years	85	81.0
	Total	105	100.0

Source: Compiled by the researchers

Majority of the respondents (52.40%) have formed their business and only 9.50% of them have purchased their business from others. Most of the respondents have experience more than 10 years and only 1.90% of them have experience less than 5 years.

Production Related Challenges face by the Grain Processing Units of West Bengal

In this section the researcher has tried to identify the production related issues and challenges through the three factors i.e. raw materials, workers and production process related challenges of the respondent units. These three factors have been discussed below:

(1) Raw Materials Related Challenges

Raw materials of rice mills i.e. paddy is available in West Bengal, but wheat and pulses are not produced in sufficient quantity in West Bengal. Wheat and pulses are imported from other states as well as from other countries. In this section of the study has discussed the raw materials related challenges.

Priority factor of collecting raw materials

Table-4 has shown the important factor considered by the respondents at the time of collecting raw materials.

Table 4: Factor give Maximum Priority of Collecting Raw Materials

Which factor did you give maximum priority at the time of collecting raw materials?	Frequency	Percentage
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Quality of raw materials	32	30.50
Price of raw materials	49	46.70
Supply of raw materials	24	22.80
Total	105	100.00

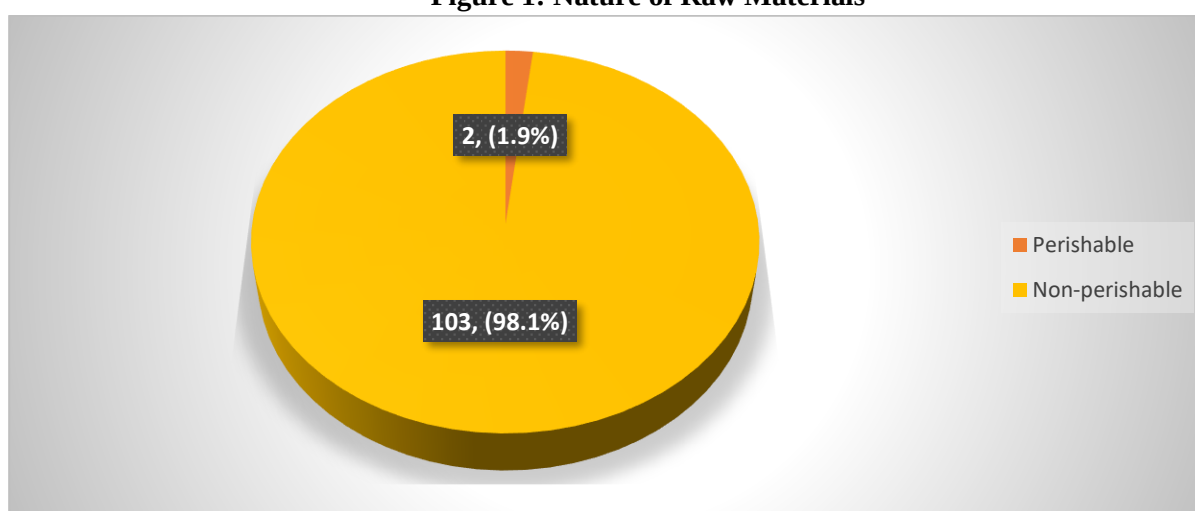
Source: Compiled by the researchers)

Majority of the respondents (46.70%) give maximum priority to the 'price of raw materials at the time of purchasing or collecting raw materials and only 22.80% of respondents give priority to the 'supply of raw materials'.

Nature of raw materials

Raw materials of food processing industries are of two types (a) perishable (b) non-perishable.

Figure 1: Nature of Raw Materials



Source: Compiled by the researchers

Raw materials used by the majority of the units (98.10%) are non-perishable in nature and 1.90% are perishable in nature.

Quality of raw materials

Quality of raw materials vary due to several reasons. Table-5 has shown the quality of raw materials.

Table 5: Quality of Raw Materials

Quality of raw materials available in West Bengal varies widely	Frequency	Percentage
Strongly Agree	36	34.3
Agree	23	21.9
Neutral	9	8.5
Disagree	15	14.3
Strongly Disagree	22	21.0
Total	105	100.0

Source: Compiled by the researchers

Majority of the respondents 56.20% i.e. strongly agreed and agreed that quality of raw materials varies widely. 35.30% respondents disagreed and strongly disagreed with the statement.

Price of Raw Materials

Purchase price of raw materials is very important factor in determination of cost of sales. Price fluctuation has shown in the table-6:

Table 6: Price of Raw Materials

Price of raw materials fluctuate widely	Frequency	Percentage
Strongly Agree	31	29.5
Agree	32	30.5
Neutral	11	10.5
Disagree	20	19.0
Strongly Disagree	11	10.5
Total	105	100.0

Source: Compiled by the researchers

Maximum respondents (60%) have accepted that price of raw materials fluctuate widely throughout the year. But 29.50% respondents replied price of their raw materials more or less remain unchanged throughout the year.

Impact of raw materials on production

Table-7 has shown the impact of raw materials on production.

Table 7: Impact of Raw Materials on Production

Production was disrupted due to problem of raw materials	Frequency	Percentage
Strongly Agree	27	25.7
Agree	24	22.9
Neutral	18	17.1
Disagree	24	22.9
Strongly Disagree	12	11.4
Total	105	100.0

Source: Compiled by the researchers

Majority of the respondents i.e. 48.60% have accepted that their production was disrupted due problem of raw materials. 34.30% of respondents replied that their production never disrupted due to any problem of raw materials.

Role of middleman in price determination

Manufacturers collect raw materials from different source. They purchase raw materials from farmers directly, but most of the times they purchase it from open market. Middleman controls the open market. Table-8 has shown the influence of middleman in price determination of raw materials.

Table 8: Influence of Middleman on Price Determination of Raw Materials

Middleman influences price of raw materials	Frequency	Percentage
Strongly Agree	26	24.76
Agree	31	29.52
Neutral	12	11.43
Disagree	20	19.05
Strongly Disagree	16	15.24
Total	105	100.0

Source: Compiled by the researchers

54.30% of respondents have replied that the middleman influences the price of raw materials. 11.40% of respondents did not comment on this but 34.02% of respondents did not accept that middleman influences price of raw materials.

(2) Workers Related Challenges

Workers are the main pillars of grain processing units. In this sector heavy machines are used for which trained and skilled workers are required to operate those machines. Unskilled workers are also required

for other purpose. These workers have many challenges. In this sector the study has discussed the challenges related to workers. Table-9 has shown workers related challenges in food processing industries.

Table 9: Workers Related Problem

Unit is suffering a lot for workers related problem	Frequency	Percentage
Strongly Agree	28	26.7
Agree	28	26.7
Neutral	20	19.0
Disagree	17	16.2
Strongly Disagree	12	11.4
Total	105	100.0

Source: Compiled by the researchers

Majority of the respondents 53.40%, strongly agreed and agreed that their unit is suffering due to workers related problem. 27.60% of respondents are not suffering due to workers related problem.

Permanent Workers

Permanent workers are an essential element of a manufacturing units. Table-10 has shown permanent workers in food processing units.

Table 10: Permanent Workers in Food Processing Units

Permanent Workers in your unit are insufficient	Frequency	Percentage
Strongly Agree	29	27.6
Agree	23	21.9
Neutral	18	17.1
Disagree	14	13.4
Strongly Disagree	21	20.0
Total	105	100.0

Source: Compiled by the researchers

Most of the respondents i.e. 49.50% have replied that permanent workers are insufficient in their organisation. 17.10% did not reply. 33.40% of respondent units have sufficient number of permanent workers in their organisation.

Workers Migration

Workers migration is a serious issue to any manufacturing units. Workers migration in the surveyed food processing units has shown in the table-11:

Table 11: Worker migration in Food Processing Units

Worker migration is a serious issue for your unit	Frequency	Percentage
Strongly Agree	27	25.7
Agree	28	26.7
Neutral	20	19.0
Disagree	16	15.2
Strongly Disagree	14	13.4
Total	105	100.0

Source: Compiled by the researchers

Majority of the respondents 52.40% have strongly agreed and agreed that workers migration is really a serious to their units. 19% of the units did not respond. But 28.60% of respondents disagreed and strongly disagreed in this regard.

Availability of skilled workers

Skilled workers in grain processing units are an important part. In grain units, heavy machines are used. To operate such machines skilled workers are required in sufficient number. Table-12 has shown in skilled workers availability.

Table 12: Availability of Skilled Workers in Food Processing Units

Skilled workers are unavailable for your unit	Frequency	Percentage
Strongly Agree	24	22.9
Agree	30	28.6
Neutral	13	12.3
Disagree	23	21.9
Strongly Disagree	15	14.3
Total	105	100.0

Source: Compiled by the researchers

Most of the respondents 61.50% accepted that skilled workers are not in sufficient number to operate machineries in grain processing units. But 42.60% have replied that skilled workers are in sufficient.

Training of workers

Training is very important to the skilled workers to operate machineries in grain units. Table-13 has shown it below.

Table 13: Training of Skilled Workers

Skilled workers of your unit didn't receive any training from training institutes	Frequency	Percentage
Strongly Agree	18	17.1
Agree	24	22.9
Neutral	17	16.2
Disagree	28	26.7
Strongly Disagree	18	17.1
Total	105	100.0

Source: Compiled by the researchers

Majority 43.80% of the respondents have replied that their skilled workers are trained from different institutions. 40% employee did not received training from any institutes.

Training of export quality product production

Table-14 has shown workers training for production of export quality food products.

Table 14: Training of Export Quality Product production

Workers are not trained enough to produce export quality finished products	Frequency	Percentage
Strongly Agree	23	21.90
Agree	20	19.00
Neutral	18	17.20
Disagree	21	20.00
Strongly Disagree	23	21.90
Total	105	100.00

Source: Compiled by the researchers

From the above table it has found 41.90% respondents have replied that skilled workers of their units are trained enough to produce export quality food products. 17.20% of respondent units kept silence in this regard. 40.90% of respondents have answered that their skilled workers did not receive enough training to produce export quality products.

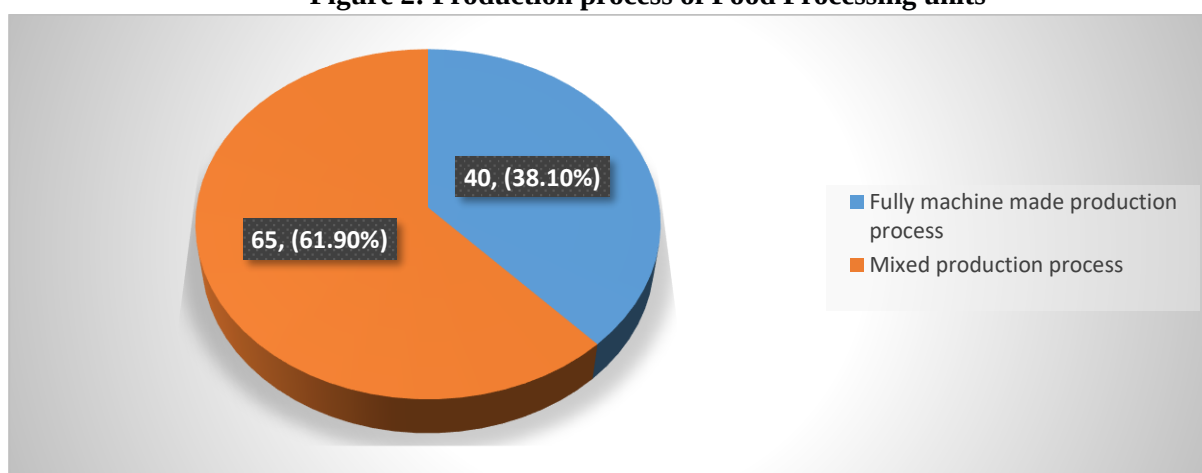
(3) Production Related Challenges

In grain processing units, products quality depends on the production process of the units. Different types of machineries are used in these sectors. In this section the study has shown the production related challenges faced by the surveyed units.

Production process of food processing units

In grain processing units two types of processing methods are followed i.e. mixed production method where both machines and manual both are used simultaneously and other one is fully machine made production method. The Exhibit-2 has shown the production process of surveyed grain processing units.

Figure 2: Production process of Food Processing units



Source: Compiled by the researchers

Majority (61.90%) of the respondent units use mixed production process i.e. combination of machine and handmade process and 38.10% of the respondents use fully machine made production process.

Satisfaction with current production process

Table-15 has shown the satisfaction of current production process.

Table 15: Status of Current Production Process

The unit not satisfy with current production process	Frequency	Percentage
Strongly Agree	17	16.2
Agree	25	23.8
Neutral	11	10.5
Disagree	33	31.4
Strongly Disagree	19	18.1
Total	105	100.0

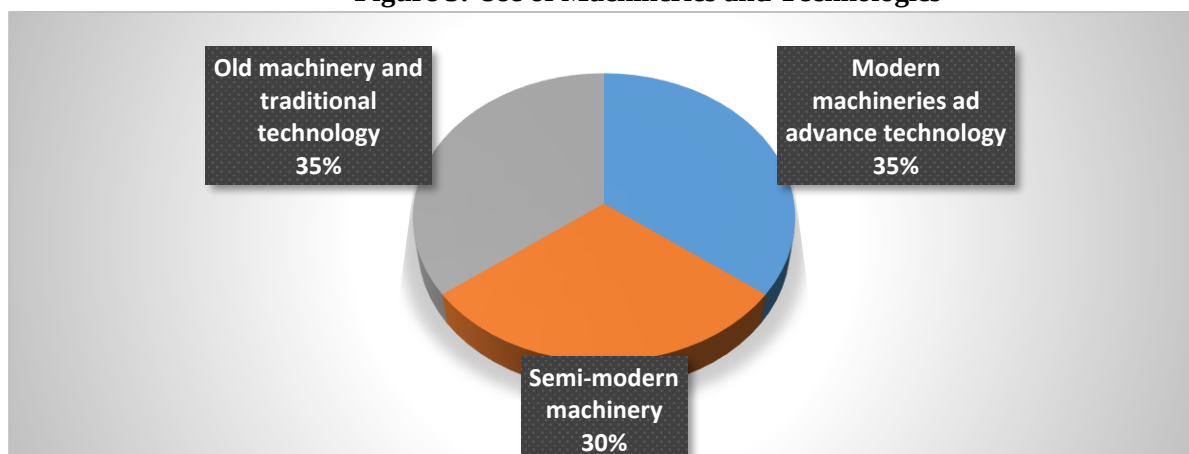
Source: Compiled by the researchers

Most of the (49.50%) respondents have replied that they are not satisfied with their current production process, but 40% of the respondents are satisfied with their current production process.

Use of machineries and technologies

In grain processing units, production is based on machineries and technologies. Exhibit-3 has shown use of machineries and technologies in grain processing units.

Figure 3: Use of Machineries and Technologies



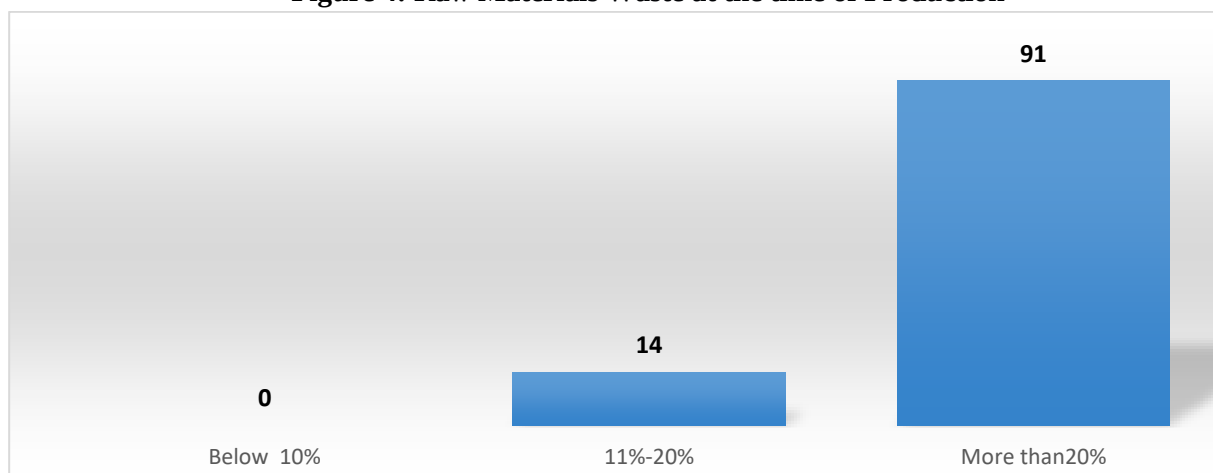
Source: Compiled by the researchers

From the above pie-chart it has found that 35% of the respondent units use Modern machineries and advance technologies and 35% of the respondent units use old machineries and traditional technologies. But 30% of the respondent units use semi-modern machineries.

Raw materials waste at the time of production

Exhibit-4 has shown, raw material wastage at the time of production in the grain production unit.

Figure 4: Raw Materials Waste at the time of Production



Source: Compiled by the researchers

Wastage at the time of production in grain processing unit is very high. Majority (91 units) of the respondent units have accepted that their raw materials wastage at the time of production is more than 20%. Only 14 respondent units have replied their wastage rate is between 11%-20%. No units has wastage rate less than 10%.

Production capacity of the units

Table-16 has been shown the production capacity of the respondent grain processing units.

Table 16: Production Capacity of Grain Processing Units

Present production method of the unit can't fulfil the market demand of finished products	Frequency	Percentage
Strongly Agree	18	17.2
Agree	20	19.0
Neutral	12	11.4
Disagree	24	22.9

Strongly Disagree	31	29.5
Total	105	100.0

Source: Compiled by the researchers

Majority of the respondents (53.40%) have answered that they can fulfil their market demand through their present production process. 36.10% respondents have replied that they couldn't fulfil their market demand through their present production process.

Production of export quality products

Table-17 has been shown, production of export qualities food products by the grain processing units.

Table 17: Production of Export Quality Products

The unit can't produces export quality finished food products through present production process	Frequency	Percentage
Strongly Agree	22	21.0
Agree	19	18.1
Neutral	10	9.5
Disagree	27	25.7
Strongly Disagree	27	25.7
Total	105	100.0

Source: Compiled by the researchers

From the above table it has observed that 55.40% of the respondent units can produce export quality food products through their present production process. 39.10% of the respondents replied that they can't produce export quality food products through their current production process.

Results of Chi-Square Test

In this study the researcher has been set total 5 hypotheses. The hypotheses have been tested through Chi-square Test. To check the association between the variable related to raw materials, workers and production process of the units the researcher has been conducted the Chi-square Test. The result of the Chi-square Test has been shown in the table-18:

Table 18: Result of the Chi-square Tests

Hypotheses		Chi-square Test		Null Accepted/ Not Accepted
		P Value	Sig.	
Hypotheses 1	H ₀ : There is no association between Fluctuation in price of raw materials and role of middleman in determination of price.	82.860	0.000	Null not accepted
Hypotheses 2	H ₀ : There is no association between quality of raw materials and disruption in production of the units.	29.713	0.020	Null not accepted
Hypotheses 3	H ₀ : There is no association between workers migration and availability of permanent workers	98.132	0.000	Null not accepted
Hypotheses 4	H ₀ : There is no association between training of workers and production of export quality food products	52.342	0.000	Null not accepted

Hypotheses 5	H ₀ : There is no association between types of machineries and technologies and wastage of raw materials.	9.287	0.010	Null not accepted
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Source: Compiled by the researchers

Hypotheses-1: The P value of the Pearson Chi-Square statistic is 0.000, which is less than 0.05. So, the null Hypotheses has been not accepted and the alternative Hypotheses has been accepted. Therefore, it can be said that there is an association between fluctuation in price of raw materials and role of middleman in determination of price. So, it can be said that the price of raw materials is influenced by the middleman.

Hypotheses-2: P value of the Pearson Chi-Square statistics is 0.020, which is less than 0.05. So, the null Hypotheses has been not accepted and the alternative Hypotheses has been accepted. Therefore, it can be said that there is an association between quality of raw materials and disruption in production of the units. Production sometimes disrupted due to problem of quality of raw materials.

Hypotheses-3: P value of the Pearson Chi-Square statistic is 0.000, which is less than 0.05. So, the null Hypotheses has been not accepted and the alternative Hypotheses has been accepted. Therefore, it can be said that there is an association between workers migration and availability of permanent workers. Permanent employees are insufficient in grain processing units due to labour migration problem.

Hypotheses-4: P value of the Pearson Chi-Square statistic is 0.000, which is less than 0.05. So, the null Hypotheses has been not accepted and the alternative Hypotheses has been accepted. Therefore, it can be said that there is an association between training of workers and production of export quality food products. Training of skilled workers is very important to produce export qualities food products.

Hypotheses-5: P value of the Pearson Chi-Square statistic is 0.010, which is less than 0.05. So, the null Hypotheses has been not accepted and the alternative Hypotheses has been accepted. Therefore, it can be said that there is an association between types of machineries and technologies and wastage of raw materials. Wastage of raw materials depends on the use of machineries and technologies.

Principal Component Analysis (PCA)

The researcher conducted Principal Component Analysis (PCA). In PCA the researcher considered ten issues and challenges related variables to understand whether they are correlated or not. The researcher has been divided the PCA into four sections i.e. (a) KMO-Bartlett's Test, (b) Analysis of Eigenvalues and Variance Explained, (c) Analysis of Scree Plot and (d) Analysis of Rotated Component Matrix, to discuss the results of the PCA.

KMO and Bartlett's Test

The result of KMO and Bartlett's test is shown below in the table-19:

Table 19: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.684
Bartlett's Test of Sphericity	Approx. Chi-Square	479.473
	df	45
	Sig.	0.000

Source: Compiled by the researchers

From the above table, it has been seen that the calculated Kaiser-Meyer-Olkin of sampling adequacy value is .684. The result is satisfactory and PCA can be run successfully.

The calculated Bartlett's Test value is .000. So, the correlation matrix is not an identity matrix. Here, both the results are positive; therefore, PCA can be undertaken.

Analysis of Eigenvalues and Variance Explained

An Eigenvalue represents the amount of variance associated with the factor. Total Variance is explained by Initial Eigenvalues, Extraction sums of squared loading and Rotation sums of squared loading. Results of the total variance has been shown in the table-20:

Table 20: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.094	30.937	30.937	3.094	30.937	30.937	2.802	28.020	28.020
2	2.301	23.009	53.946	2.301	23.009	53.946	2.391	23.913	51.933
3	1.928	19.281	73.227	1.928	19.281	73.227	2.129	21.294	73.227
4	.619	6.193	79.420						
5	.564	5.640	85.060						
6	.464	4.644	89.704						
7	.374	3.742	93.447						
8	.273	2.728	96.175						
9	.213	2.130	98.305						
10	.169	1.695	100.000						
Extraction Method: Principal Component Analysis.									

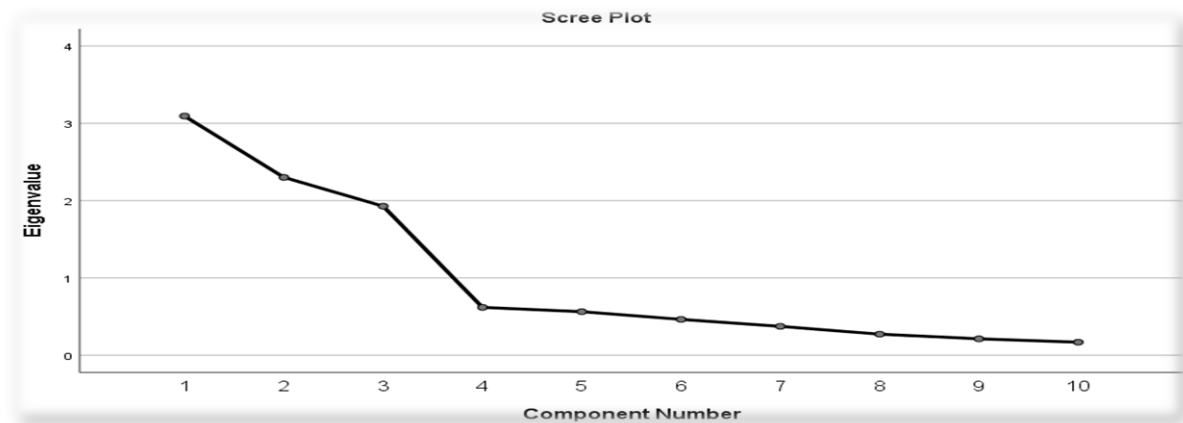
Source: Compiled by the researchers

From the above table it has been observed that Eigenvalues, as well as the associated proportion of variance, are explained by each dormant factor. The Eigenvalue of the first three components is more than 1. In this case, the result is 73.227%. This means that the first three components together account for 73.277% of the total variance.

Analysis of Scree Plot

Scree Plot is nothing but the graphical representation of Eigenvalue against each component. The components have 1 or more than 1 eigenvalue, plotted above 1 bar and the components have eigenvalue below 1, plotted between 1 and 0 in the scree plot. Scree plot has been shown in the figure-5:

Figure 5: Scree Plot



Source: Compiled by the researchers

From the above graphical representation, it has been observed that 3 components have more than 1 eigenvalue and they were plotted above bar 1. After the third component, the line is almost flat, therefore it can be concluded the first three components have the most explanatory power and the rest eighteen components account for lesser and lesser amounts of the total variance.

Analysis of Rotated Component Matrix

The Rotated Component Matrix table helps to understand the result of the analysis. The components are rotated so that they are easier to interpret. The rotated component matrix has been shown in the Table-21:

Table 21: Rotated Component Matrix

	Component		
	1	2	3
Permanent employees in your unit are insufficient	0.922		
Skilled labour are unavailable for your unit	0.893		
Worker migration is a serious issue of your unit	0.883		
Skilled labours of your unit didn't receive any training from training institutes	0.546		
The unit can't produces export quality finished food products through present production process		0.888	
Present production method of the unit can't fulfil the market demand of finished products		0.843	
Workers are not trained enough to produce export quality finished products		0.783	
Middleman influences price of raw materials			0.884
Quality of raw materials available in West Bengal varies widely			0.818
Price of raw materials fluctuate widely.			0.816
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.			
a. Rotation converged in 4 iterations.			

Source: Compiled by the researchers

The rotated component matrix has showed loading of each variable after rotation. Here the researcher used the option and subcommand and suppressed the absolute values less than 0.50.

The Principle Component Analysis has considered 3 factors which are responsible for challenges in food processing industries.

The first component has 4 variables, (a) Permanent employees in your unit are insufficient, (with loading, 0.922) (b) Skilled worker are unavailable for your unit, (with loading, 0.893) (c) Worker migration is a serious issue of your unit (with loading, 0.833) (d) Skilled labours of your unit didn't receive any training from training institutes (with loading, 0.546). The first component clearly reflects the '**Workers related challenges**'.

The second component has 3 variables, (a) The unit can't produce export quality finished food products through present production process, (with loading, 0.888) (b) Present production method of the unit can't fulfil the market demand of finished products, (with loading, 0.843), (c) Workers are not trained enough to produce export quality finished products, (with loading, 0.783). The second component reflects '**Training and Production related challenges**'.

The third component has 3 variables, (a) Middleman influences price of raw materials (with loading, 0.884) (b) Quality of raw materials available in West Bengal varies widely, (with loading, 0.818), (c) Price of raw materials fluctuate widely, (with loading, 0.816). The third component reflects '**Raw materials related challenges**'.

6. Conclusion and Recommendations

The majority of owners, according to the survey, are men. In the food processing industry, many proprietors have more than 10 years of experience. The raw materials, labour, and production-related concerns have been identified to be the three main challenges in the assessed grain processing units. The raw materials that the responder units use differ in quality, and their prices change often. Poor quality and fluctuating raw material prices affected the production process as well. Middlemen control the price of raw materials in the market by controlling the supply and demand of raw materials in the market. Due to a shortage of skilled personnel, the problem of labour migration is severe in the grain processing units. Lack of training facilities and fewer training programmes are to blame for the units' shortage of trained staff. The majority of the grain processing industries surveyed use outdated or partially modern gear and a traditional processing system. Units' existing production strategy does not meet their needs. They were also unable to manufacture processed food products of exportable quality. Modern grain mills have reduced the wastage rate in comparison to traditional grain mills. The modern grain processing units are using cutting-edge technology and contemporary equipment to produce completed goods of export standard.

Respondent units may choose contract farming or buy a large number of superior quality raw materials directly from the farmers to address the issues of raw material quality, price, and middlemen's impact. To set up an effective training course for its employees, responding units must act on their own. Modern machinery and advanced technology were appreciated by all responding units. By replacing their outdated and imperfectly current equipment, they should transform their conventional grain mills into modern ones. Government support is crucial for the expansion of grinding mills. The government has already put in place a number of programmes for the food processing businesses. Respondents should utilise these programmes' advantages.

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