

## Profiling Actors and Risk Management in the Cashew Supply Chain in Kogi State, Nigeria

### ABSTRACT

This study profiled actors and analyzed the risks associated with cashew supply chain in Kogi State, Nigeria. It specifically profiled actors in the cashew supply chain by socioeconomic indicators, identified the risks associated with the cashew supply chain, ascertain the severity of the supply chain risks, and assess the strategies employed by the actors to mitigate the effects of the risks. Multistage random sampling technique was used to select one hundred farmers, twenty each of major buyers, warehouse owners and processors. Primary data used for the study was obtained using questionnaire design and interview schedule. Data obtained were analysed using descriptive statistics and mean score from a three point Likert type of scale. The findings revealed more males than females' actors across the cashew supply chain. The mean age was 37 years, 39 years, 40 years and 37 years for farmers, major buyers, warehouse owners, and processors respectively. The findings on risks associated with the cashew supply chain revealed that production and climate related risks are more recorded among the cashew nut farmers and processors. Also, financial related risks was a major source of risk among actors whose activities are marketing related, while government policy or institutional related risks was recorded across all actors in the cashew supply chain. Furthermore, 95% and 65% of farmers and processors ( ) in the cashew supply chain agreed to the severity of production related risks in their activities, while 85%, 80%, 75% and 70% of farmers, major buyers, warehouse owners and processors respectively, agreed to the severity of financial related risks. Climate related risk was more severe among the farmers (75%) while the severity of institutional related risk was more among major buyers (85%) and warehouse owners (75%). The various strategies employed by actors across the cashew supply chain to mitigate the effects of risks were generally preventive strategies. Based on the findings from the study, the need for cooperative formation, financial literacy training, and awareness on the need for agricultural insurance participation by farmers and other agribusiness actors were recommended.

**Keywords:** Actors, Cashew, Profile, Risks, Severity, Strategies

### INTRODUCTION

Cashew (*Anacardium occidentale L*) is one of the major cash crops in Africa; ranking third in world production of edible nuts ( ). It is a perennial crop belonging to the *anacardiaceae* family. The raw cashew nut (RCN) is the main commercial product of the cashew tree in Nigeria. Products such as cashew apple, nuts and nut shells, liquids (NSL) are obtained from the tree and are highly valued on both domestic and international markets. In West Africa, cashew is the second high value export crop after Cocoa (Nitidae, 2019). This has made the region an active player in the global cashew market, with a share of 45% since 2015 (Monteiro *et al.*, 2017). D'Ivoire and Nigeria were the top producers of cashew in the region, with individual yields exceeding 340,000 metric tonnes per annum (FAO, 2020).

In order to increase efficiency and income, actors in the cashew nut supply chain need various types of services such as extension services, financial services or marketing services.

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Apparently, the design and delivery of these services require the mash-up of data at the actor's level. Expectedly, profiling presents a practical and operational recipe for cashew stakeholders such as farmers' organizations, cooperatives, agribusinesses or governments to ease the delivery of added-value services.

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Risk and uncertainty are inherent in the cashew nut supply chain. The most common sources of risk are weather, climate, diseases, natural disasters, and market and environmental shocks ( ). Other risks relate to logistics, infrastructure, the political situation and institutions. Some risks have become more severe in recent years due to climate change and the price volatility ( ). Actors in the cashew nut supply chain may have difficulty in assessing and managing risk, and fail to benefit from investment opportunities that could improve their businesses and strengthen household resilience.

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The risk situation is complicated by the fact that the actors operate in an environment with weak markets. They do not have access to sufficient support institutions that can help them cope with risks. The policies described for risk management include risk sharing institutions like the agricultural insurance scheme that help reduce the burden of risk through sharing with a third party (Shaibu *et al.* 2019). Since private sector insurance products in agriculture are scanty and very few are still in their development stages, farmers have chosen self-insurance strategies that include social mechanisms and diversification for coping with risk ( ). There is therefore the need to profile actors in the cashew supply chain, and also understand the associated risks and the management strategies adopted by the actors.

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## 2.0 METHODOLOGY

The study area was Kogi State, Nigeria. Kogi State was created on 27th August, 1991 with capital in the confluence town of Lokoja. The State is located between longitudes 5<sup>0</sup>18 E and 7<sup>0</sup>94 E; and latitudes 6<sup>0</sup>30' N and 8<sup>0</sup>42'N. Kogi State has a land area of approximately 28,044 square kilometers. It is surrounded by ten other states and the Federal Capital Territory (FCT) as follows: Niger State and FCT to the North; Nasarawa State to the Northeast; Benue State to the east; Enugu State to the Southeast; Anambra State to the South; Edo, Ondo and Ekiti States to the South and southwest; and Kwara State to the North-West. The State is a leading producer of cashew in Nigeria.

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Multi-stage random sampling technique was used to select respondents for the study. The first stage was the selection of two agricultural zones (B and D). These zones were selected based on their involvement in the cashew nut supply chain. In stage two, three LGA's were purposely selected from the two zones- Dekina, Ankpa and Ofu. Stage three involves the selection of four Wards from Dekina local government and three wards each from Ankpa and Ofu local government areas. This gives a total of ten wards for the study. In stage four, ten cashew nut farmers were randomly selected from each ward. Also, two actors each of warehouse owners, buyers (Major or Minor) and processors were randomly selected from each ward. A total of one hundred cashew nut farmers, twenty warehouse owners, twenty buyers, and twenty processors were used for the study.

Data for this study was collected from the primary source. The primary data was obtained using a well-structured questionnaire that was administered to the cashew supply chain actors on a face-face basis. Data collected were analyzed using descriptive statistics, and proportion of mean score from a three point Likert type of scale. Descriptive statistics, proportion and mean

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score from a three point Likert type of scale. The three point Likert scale was used to assess severity of risks as specified below:

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<b>Opinion</b>	<b>Point</b>
Very Severe (VS)	3
Severe (S)	2
Not Severe (NS)	1

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The mean response to each item was calculated using the following formula:

$$\bar{X} = \frac{\sum FX}{N}$$

Where:  $\bar{X}$  = means response,  $\sum$  = summation, F = number of respondents choosing a particular scale point, X = numerical value of the scale point and N = total number of respondents to the item. The mean response to each item was interpreted using proportional values.

UNDER PEER REVIEW

### 3.0 RESULTS AND DISCUSSION

#### 3.1 Profiling of Actors in the Cashew Supply Chain

Actors in the cashew nut supply chain in Kogi State, Nigeria were profiled in line with their socioeconomic characteristics as presented in Table 1. The socioeconomic indicators considered in this study include; sex, age, marital status, family size, educational background, business experience, and cooperative membership.

##### Sex

The distribution of actors in the cashew supply chain according to their socioeconomic characteristics as indicated in Table 1 shows that more males are found across the supply chain than their female counterparts. The involvement of male in cashew nut farming, marketing and processing could be associated with the nature of activities expected to be performed across the supply chain. Men are energetic and will have the power to exercise such duties. Females could be said to be involved in other productive ventures. The findings on sex agrees with the report of Salau *et al.* (2017) when they said that males (81%) were more involved in cashew nut wholesale marketing and processing than their female counterparts in Kwara State, Nigeria.

##### Age

The mean age of 37 years, 39 years, 40 years and 37 years for farmers, major buyers, warehouse owners, and processors respectively, could be regarded as active and productive age. In Nigeria's age categorization, the actors are basically youth in their productive age ( ). This age category is necessary for high productivity in the cashew industry. The nature of activities which requires some level of physical power could also explain the involvement of youth across the cashew supply chain. Farmers in this age group constitute the very energetic youth and are likely to work effectively to increase their output and yields. This findings agrees with Farayola *et al.* (2013) who reported that cashew nut markets and farmers in Oyo State, Nigeria are in their active and productive age of 41 years. The result also agrees with Enwelu *et al.* (2014) who reported a mean age of 31 years for cashew nut farmers in Enugu North, Nigeria.

##### Marital Status

The marital status distribution of the actors as shown in Table 1 indicates that more married actors are found across the cashew nut supply chain. Pointedly, 59%, 75%, 80%, and 75% of the farmers, major buyers, warehouse owners, and processors, respectively were married. The result is expected because married people are societally assumed to be more responsibly and ready to provide daily meals for their households. Hence, their involvement in income generating activities such as cashew nut production, processing and marketing. Sirela *et al.* (2018) and Salau *et al.* (2013) reported similar findings among cashew nut farmers and marketers in India and Nigeria, respectively. Outcome of this present study indicates a higher chance of involving family labour in cashew nut farming, processing and marketing.

##### Family Size

The mean household size across actors in the cashew nut supply chain as shown in Table 1 are between 5 and 6 members. Household size is the sum total number of people that were leaving with the respondents and benefit from the income generated from cashew nut farming, production or marketing, as the case may be. The relatively large household size recorded among the respondents implies that the high profit margin in the industry may have been the motivational factor sustaining the business and their households over years. Similar pattern was reported by Wongnaa (2013) among cashew actors in Ghana. The findings also agrees with Salau *et al.* (2017) who reported that majority of cashew nut processors and marketers in Kwara State has relatively large household size which is an indication of availability of labour for cashew processing.

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## Education

Education shows whether an actor is literate or learned. Education is very important in the development of any country's economy, cashew supply chain inclusive. The educational levels of respondents were based on the numbers of years spent in school. Table 4.1 shows that 89%, 100%, 85% and 80% of cashew nut farmers, major buyers, warehouse owners and processors ( ) have various levels of educational qualifications. This implies that, the respondents are knowledgeable and will be open to adopt new technology and innovations across the cashew nut supply chain. This result is in consonance with the findings of Enwelu *et al.* (2014) who reported high literacy level for cashew nut farmers in Enugu, Nigeria. In India, Samaripitha (2016) noted that the educational profile of the farmer decides the relative exposure of the farmer to latest technologies.

## Business Experience

The average number of years spent in cashew business across actors in the cashew supply chain as presented in Table 1 was between 5 and 9 years. The mean production, processing and marketing experience in this study shows that farmers, processors and marketers had considerable years of experience which is an advantage towards production and adoption of technologies in the cashew supply chain. Expectedly, the higher the experience the better the knowledge and skills in production, processing and marketing. This findings agree with Ogah *et al.* (2020) who reported a mean processing experience of 8 years among cashew nut processors in Benue State, Nigeria.

## Cooperative Membership

The results shown in Table 1 indicates that except for farmers and processors who are members (59% and 60%, respectively) of cooperative association, majority of cashew nut major buyers (80%) and warehouse owners (65%) are not members of cooperative association. Membership of an association is expected to enhance information dissemination and efficient marketing of cashew nuts.

## 3.2 Risks associated with the Cashew Supply Chain

The distribution of actors according to risks associated with the cashew supply chain is presented in Table 2. The result shows that production related risks were more recorded among the cashew nut farmers ( ) in the study area. Relatively high percentage of the processors ( ) also recorded production related risks. Other actors such as major buyers and warehouse owners were less affected with this type of risk. The production related risks among actors in the cashew supply chain include low standard of nut size, poor quality of kernel, crop failures and pest and disease. This risk source has implications on cashew productivity and products. Production risk results from the uncertain natural growth processes of the cashew nuts and affect both the quantity and quality of cashew nuts produced and processed. This findings agree with Aminu *et al.* (2019) who reported that crop farmers in Ogun State, Nigeria are faced with production risks such as pests and diseases (75.8%), erratic rainfall (98.3%) and inadequate soil nutrients (40%), with negative effect on the output as well as income realised by the farmers.

Table 2 further shows that financial related risks was a major source of risk among actors whose activities are marketing related. This finding is not surprising considering the nature of financial related risks, which involve loss of investment, poor profit margin and poor sales. In the cashew supply chain, financial risk usually occurs when money is borrowed to finance the business ( ). This risk can be caused by uncertainty about future interest rates, a lender's willingness and ability to continue to provide funds when needed, and the ability of the farmer

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to generate the income necessary for loan repayment. This risk type focus on uncertainty with prices, costs and market access. This findings agree with Lazzaroni and Wagner (2016), who reported that 90% of rural farmers and marketers in Senegal are faced with financial or market related risks in their agribusiness activities.

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Climate related risks such as poor sunlight and bad weather are the major source of risks among farmers and processors along the cashew supply chain. Other climate related risks noted in this study include excess rainfall and flooding in some selected areas of the State. This finding agrees with Shaibu *et al.* (2019) who reported that 29.6% of farmers in Kogi State, Nigeria experienced erratic rainfall as a major source of climate related or natural risks. The authors further reported low percentage (2.9%) of drought as a type of climate related risk and attributed the result to the geographical location of the State.

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Government policy or institutional related risks was recorded across all actors in the cashew supply chain. In this study, Institutional risks relate to unpredictable changes in the policies and regulations of government and other relevant agencies that affect activities along the cashew supply chain. Some of these government actions concerns high levies, ban on exportation, and poor regulation of prices. Government, a formal institution, may create risks through unpredictable changes in policies and regulations, factors over which farmers have limited control. This finding also agrees with Shaibu *et al.* (2019) who reported change in government policy as a major source of shocks in agricultural production and suggested the adoption of agricultural insurance scheme to reduce the negative effect of agricultural risks or shocks.

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### 3.3 Severity of the Supply Chain Risks

The severity of risks in the cashew supply chain across the actors is presented in Figure 1. The proportion of actors in each risk category was obtained from the calculated mean score from a three point Likert type of scale. The result presented in Figure 1 shows that 95% and 65% of farmers and processors ( ) in the cashew supply chain agreed to the severity of production related risks in their activities. This risk type is however not severe among other actors such as the major buyers and warehouse owners. This finding could be associated with the nature of operations carried out by the farmers and processors.

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On financial risks, severity of the risk type was more across all actors in the cashew supply chain. This is evident as 85% of farmers agreed that financial related risk is severe in the area, 80% of the major buyers also agreed to the severity of this risk type, while 75% and 70% of warehouse owners and processors ( ) agreed to the severity of financial related risks. This pattern of severity observed across actors in the cashew supply chain may not be unconnected with the role of finance in agricultural production/farming, processing of agricultural produce and marketing activities. Figure 1 further revealed that climate related risk was more severe among the farmers (75%) while the severity of government policies or institutional related risk was more among major buyers (85%) and warehouse owners (75%).

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### 3.4 Strategies employed by the Actors to mitigate the effects of the Risks

Risks are completely unavoidable in agriculture. Farmers and agro-entrepreneurs must consistently adopt some measures to mitigate the effect of risk on their enterprise. Risk management, according to United State Department of Agriculture (2016), involves making selection among alternatives that degrade the economic consequences that can result from risks and uncertainties. The various strategies employed by actors across the cashew supply chain to mitigate the effects of risks is presented in Table 3, and the result revealed that actors in the cashew supply chain adopted preventive strategies in mitigating the effect of production related risks. The preventive strategies include buying cashew nuts from the right source and proper agronomic practices. This finding agrees with Aminu *et al.* (2019) who reported that the major preventive strategy adopted by crop farmers in Ogun State, Nigeria were the use of agrochemicals (85%) and selling produce at reduced price (74.2%). Agrochemicals such as fertilizers and pesticides were used to curb the risk of soil fertility and pest and diseases attack.

In mitigating the effect of financial related risk, results in Table 3 reveals that significant percentage of major buyers, warehouse owners and processors adopted proper storage factories, the use of improved variety, increase in volume of nuts sold, and increase in marketing skills. Proper clearing of shades and trees and generating heat/warmth were other preventive risk management strategies adopted by actors in the cashew supply chain in specifically mitigating the effects of climate related risks.

### 4.0 CONCLUSION AND RECOMMENDATIONS

Findings from this study revealed that actors across the cashew supply chain in the study area were affected by production risk, financial risk, climate risk, and institutional risk. The results also revealed that production and climate related risks were more severe among the farmers and processors, while financial risk was severe across all actors in the cashew supply chain. The actors adopted prevention, mitigation and coping strategies to mitigate risks.

Based on the findings of the study, the followings recommendations are made:

1. Most actors were not members of a cooperative association. Strengthening the role of farmer groups or cooperatives should be considered as part of agricultural risk reduction policies in the study area. This is because farmers' groups or cooperatives can help farmers to improve their negotiating power. Higher product prices and lower input prices can then be achieved more easily due to economies of scale
2. Efforts should be targeted at training actors in the cashew supply chain (emphasis on financial management training) on the appropriate management strategies and the need for the actors to adopt innovation that will enhance improved practices.
3. Government and other relevant stakeholders should focus on creating and sensitizing the farmers on suitable insurance coverage to mitigate the effect of risks associated with production and climatic conditions.

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UNDER PEER REVIEW

**Table 1: Socioeconomic Characteristics of Actors in the Cashew Supply Chain**

Socioeconomic Characteristics	Farmers, n = 100			Major Buyers, n = 20			Warehouse Owners, n = 20			Processors, n = 20		
	Freq.	%	Mean	Freq.	%	Mean	Freq.	%	Mean	Freq.	%	Mean
<b>A. Sex</b>												
Female	19	19.0		0	0		5	25.0		1	5.0	
Male	81	81.0		20	100.0		15	75.0		19	95.0	
<b>B. Age (years)</b>												
20 – 40	64	64.0	37yrs.	13	65.0	39 yrs.	10	50.0	40yrs.	14	70.0	37yrs
41 – 60	27	27.0		7	35.0		10	50.0		5	25.0	
61 – 80	9	9.0		0			0	0		1	5.0	
<b>C. Marital Status</b>												
Single	39	39.0		5	25.0		4	20.0		4	20.0	
Married	59	59.0		15	75.0		16	80.0		15	75.0	
Widow	1	1.0		0	0		0	0		0	0	
Widower	1	1.0		0	0		0	0		1	5.0	
<b>D. Household Size (number)</b>												
1 – 6	63	63.0	6 mem bers	17	85.0	5 mem bers	17	85.0	6 mem bers	14	70.0	5 mem bers
7 – 12	35	35.0		3	15.0		3	15.0		6	30.0	
13 – 18	2	2.0		0	0		0	0		0	0	
<b>E. Educational Background</b>												
No formal education	11	11.0		0	0		3	15.0		4	20.0	
Primary education	25	25.0		0	0		0	0		1	5.0	
Secondary education	49	49.0		14	70.0		13	65.0		10	50.0	
Tertiary education	15	15.0		6	30.0		4	20.0		5	25.0	
<b>F. Business Experience (yrs.)</b>												
1 – 10	79	79.0	9 yrs.	19	95.0	6yrs.	20	100.0	5yrs.	16	80.0	6yrs.
11 – 20	14	14.0		0	0		0	0		4	20.0	
Above 20	7	7.0		1	5.0		0	0		0		
<b>G. Cooperative Membership</b>												
Member	59	59.0		4	20.0		7	35.0		12	60.0	
Non member	41	41.0		16	80.0		13	65.0		8	40.0	

Source: Field Survey Data, 2021

**Table 2: Distribution of Actors by Sources of Risks in the Cashew Supply Chain**

Sources of Risks*	Farmers, n = 100	Major Buyers, n = 20	Warehouse Owners, n = 20	Processors, n = 20
<b>A. Production Risks</b>				
Low standard of nut size	83 (83.0)	4 (20.0)	0	14 (70.0)
Poor quality of kernel	82 (82.0)	4 (20.0)	0	14 (70.0)
Crop failures/poor yield	80 (80.0)	4 (20.0)	0	9 (45.0)
Pest and disease	64 (64.0)	3 (15.0)	0	10 (50.0)
<b>B. Financial Risks</b>				
Loss of investment	53 (53.0)	16 (80.0)	19 (95.0)	11 (55.0)
Low demand of cashew produce	57 (57.0)	16 (80.0)	19 (95.0)	11 (55.0)
Poor profit margin	66 (66.0)	16 (80.0)	17 (85.0)	10 (50.0)
Poor sale	65 (65.0)	15 (75.0)	17 (85.0)	9 (45.0)
<b>C. Climate Risks</b>				
Poor sunlight	65 (65.0)	0	0	9 (45.0)
Bad weather	53 (53.0)	0	0	8 (40.0)
Excess rainfall	49 (49.0)	0	0	7 (35.0)
Flooding	45 (45.0)	0	0	7 (35.0)
<b>D. Government Policy</b>				
High levies	43 (43.0)	14 (70.0)	17 (85.0)	12 (60.0)
Ban on exportation	24 (24.0)	5 (25.0)	9 (45.0)	9 (45.0)
Poor regulation of prices	19 (19.0)	5 (25.0)	9 (45.0)	7 (35.0)

Source: Field Survey Data, 2021

NOTE: Figures in brackets are percentages

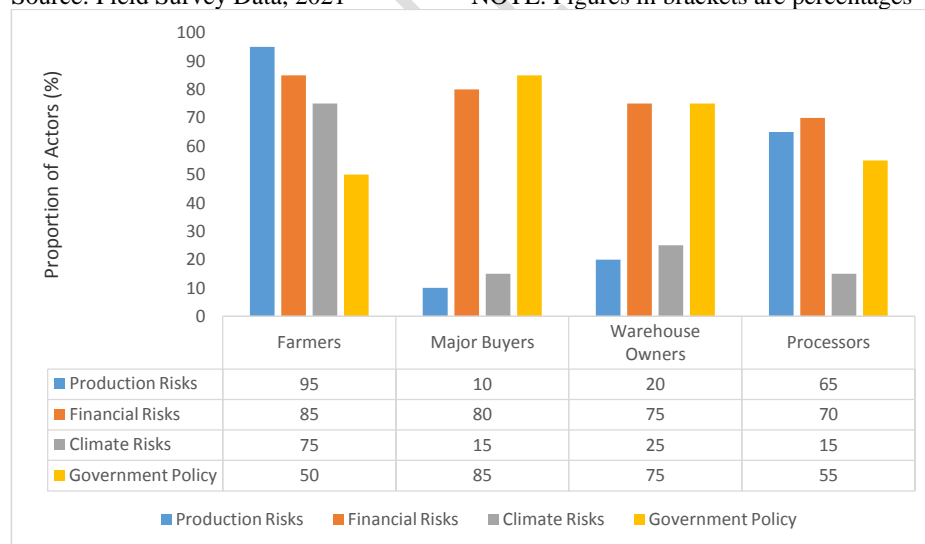


Figure 1: Proportional Distribution of Actors by Severity of Risks in the Cashew Supply Chain

**Table 3: Strategies to mitigate the effects of risks across the actors**

Strategies*	Farmers, n = 100	Major Buyers, n = 20	Warehouse Owners, n= 20	Processors, n= 20
<b>A. Production Risks</b>				
Buying nuts from legitimate source	80 (80.0)	18 (90.0)	19 (95.0)	17 (85.0)
Using proper farming methods	95 (95.0)	19 (95.0)	19 (95.0)	17 (85.0)
Using fertilizers properly	57 (57.0)	9 (45.0)	8 (40.0)	8 (40.0)
<b>B. Financial Risks</b>				
Proper storage factories	54 (54.0)	19 (95.0)	19 (95.0)	16 (80.0)
Use of improved variety	53 (53.0)	18 (90.0)	18 (90.0)	15 (75.0)
Increase in volume of nuts sold	57 (57.0)	19 (95.0)	18 (90.0)	14 (70.0)
Increase in marketing skills	56 (56.0)	19 (95.0)	19 (95.0)	13 (65.0)
<b>C. Climate Risks</b>				
Proper clearing of shades and trees	85 (85.0)	19 (95.0)	19 (95.0)	14 (70.0)
Generating heat/warmth	68 (68.0)	19 (95.0)	19 (95.0)	14 (70.0)
<b>D. Government Policy</b>				
Joining a cooperative society	53 (53.0)	19 (95.0)	17 (85.0)	9 (45.0)
Getting recognized or port license	48 (48.0)	18 (85.0)	18 (90.0)	8 (40.0)

Source: Field Survey Data, 2021

NOTE: Figures in brackets are percentages