

Improving Agricultural Outcomes: Focused Interventions for Rice Farmers in Davao Region, Philippines

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ABSTRACT

This study emphasizes the role that Accounting for Agriculture, Farm Value-Adding Activities, and Supplier Relationship play in the success of rice farmers. The study aims to determine what agricultural support programs should be implemented for a particular province considering resources constraints. By employing cluster analysis techniques such as Hierarchical and K-Means to group respondents, conducting the analysis of variance (ANOVA), and performed crosstabs, the study reveals significant variations in success factors across different clusters. The results highlight that success factors differ based on clusters and the rice farmers' province, suggesting a need for tailored interventions. This insight can help policymakers and agricultural stakeholders make decisions on how to allocate resources and enhance the well-being of rice farmers by targeting interventions in provinces where they can have the greatest impact.

Keywords: Agriculture Intervention, Success, Impact, Cluster Analysis.

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1. INTRODUCTION

Rice farming in the Davao Region of the Philippines is central to its agriculture, as it ensures that a good number of its population have something to eat from in terms of sustenance and livelihoods. However, rice farmers' success in this area depends on many factors such as farm management practices and interventions for productivity enhancement and sustainability. It is crucial to grasp how these factors are linked to come up with successful plans to boost productivity and elevate the quality of life for rice farmers.

Recent research by Castillo and Clavano (2021) revealed the key factors contributing to the success of rice farmers in the Davao Region. Three critical success metrics were discovered through their research: Accounting for Agriculture, Farm Value-Adding Activities, and Supplier Relationship. Thus, these variables illustrate the importance of value adding; efficient financial administration; plus, dependable supply chain partners towards enhancing farming effectiveness and profitability among rice growers (Hilado, Hugo, Kodama, Lebite, & Fronda, 2023). These success factors are also observed looking at the research studies conducted in other regions such as the study of Hilado, et. al (2023) in Nueva Ecija, Philippines, Pumihic (2023) in Nueva Vizcaya, Philippines, and Casinillo, Rebojo, & Dargantes (2023) in Leyte, Philippines. While on a global scale, a study by Saleh (2021) in Indonesia delves into the government's innovation interventions to

strengthen the capacity of the rice farmers wherein utilization of resources is given emphasis as contributor to success. On the other hand, Janaiah's (2018) study in India focuses on understanding the value chain in order for rice farmers to become successful.

However, while these factors contribute to farmer success, it is imperative to acknowledge the pivotal role of interventions in shaping agricultural outcomes (Pumihic, 2023). While these interventions may offer valuable insights, their efficacy in the context of the Davao Region remains uncertain. Furthermore, the interventions' implementation is also controlled by several factors such as: lack of resources, budgetary limitations of government, inadequate manpower, and one-size-fits-all syndrome (Casinillo, Rebojo, & Dargantes, 2023). This often leads to situations in which rice farmers have no choice but to use techniques that do not fit their specific needs or agricultural context thus preventing them from succeeding and perpetuating inefficiencies in the sector.

It is therefore necessary to localize or specialize interventions that address unique requirements of rice farmers in different areas of the Davao Region (Saleh, 2021). As a result, applying uniform interventions across this area with five provinces and forty-three municipalities would not be ideal for getting the best agricultural return.

Having shown all these arguments and explanations, the study tends to minimize the difference between farmers' needs and intervention strategies by clustering different provinces based on the above success factors such as Farm-Value Adding Activities, Accounting for Agriculture, and Supplier Relationship. The study aims at clustering provinces according to these factors in order to identify specific locations where focused interventions can be applied for optimal rice farming.

To sum up, this research tries to contribute towards increasing agricultural productivity and sustainability in Davao Region by identifying key success factors and forming clusters of these areas which will assist in targeting interventions to rice farmers. The study therefore employs a clustering method with a view to provide policy makers and other stakeholders on interventions that should be given priority on individual basis of rice farmers across different provinces within the region hence promoting inclusive and sustainable agriculture development. The study further envisions that the results will be useful by other regions in the Philippines and other rice producing nations around the world.

2. LITERATURE REVIEW

2.1 Key Success Factors in the Study

Anchored on the study of Castillo and Clavano (2021), the factors that were found to contribute to the success of farmers are Accounting for Agriculture, Farm Value-Adding Activities, and Supplier Relationship.

2.1.1 Accounting for Agriculture

In the past, people used to rely on memory and inventory checks to keep track of what happened during a period. This was especially common, among businesses and farmers. Like companies it is crucial for those in the agricultural sector to manage their resources

effectively by maintaining financial records. Basic financial reports like income statements and balance sheets are essential for both types of enterprises. By grasping these concepts small agricultural businesses can gain insight into their operations. Pave the way for success. According to David and David (2014) understanding finance and accounting can give an edge to an enterprise making it more appealing overall. Evaluating cost structures and revenue streams using Osterwalder and Pigneurs (2010) business model canvas can provide insights into profitability. In Michael Porters value chain analysis framework profit margins reflect business activities that result in profits when executed correctly. These authors stress the significance of recording enterprise transactions as they serve as the foundation for calculating income, balances, and cash flows. However, many farmers opt not to engage in accounting and record keeping stating that they do not see the benefits (Appiah, 2010). Additionally, a significant number of farmers lack knowledge (Cole, Sampson, & Zia, 2009) with 86.56 percent being identified as illiterate (Lalrinmawia & Gupta, 2015). Conversely farmers who practice record keeping have a chance of achieving success (Kalyango, 2014) as they can analyze their farm operations outcomes and make adjustments. This notion is supported by Figurek (2015) which found that documenting farm activities positively impacts success rates. Furthermore, understanding accounting or financial literacy can enable farmers to access services, at rates (Lalrinmawia & Gupta, 2015) as this was also found to have strong positive influence on a success of business (Syahfi, 2023).

H_{A1}. There is significant difference on Accounting for Agriculture based on the clusters generated using Cluster Analysis.

2.1.2 Farm Value-Adding Activities

A new era, in the business world has dawned, focusing more on enhancing the value of the products being created or manufactured. According to Osterwalder and Pigneurs (2010) business model, the core of their framework is the value proposition, which aims to address customer needs by solving problems and delivering benefits. In Michael Porters value chain framework, each step contributes to adding value to the end product even though profit remains the goal. When raw materials are received, they undergo processing before being dispatched to meet market demands through marketing and sales efforts. The primary activities are complemented by support activities that further enhance the value of the product offered in the market. By applying these principles, farmers can expect increased profits as suggested by Osterwalder & Pigneur (2010) and Porter (1985). In the study of Nguyen, Pham, Trieu, Lam, and Tran (2022) recommended value-adding activities as a necessity to achieve good outcomes. To add, Oshima and Toma (2023) pointed out that traditional production needs enhance through product innovation to cope with external pressures and become sustainable.

In agriculture, farmers can enhance the value of their products not by selling them from their farms but also by engaging in activities, like cleaning, packaging and labeling (Chait, 2018), sorting (UkrAgroConsult, 2016), drying (Janaiah, 2018), and adopting technology (Brown, Ebor, & Decena, 2018). Forward integration is another approach that rice farmers can consider, often known as bypassing intermediaries (Kenton, 2019). This involves tasks, like milling or processing wholesaling and retailing to boost farmers' income.

H_{A2}. There is significant difference on Farm Value-Adding Activities based on the clusters generated using Cluster Analysis.

2.1.3 Supplier Relationship

The influence of the suppliers of inputs can impact the level of competition within the industry in situations where there are few suppliers but numerous buyers, when the suppliers show intentions to forward integrate, when alternative materials are limited, when these suppliers possess valuable resources, and when switching costs for raw materials are high (David & David, 2017). In a research study involving vegetable farmers conducted by Castillo, Gordo, Jadraque, & Gonzales, 2019, some providers of farm inputs also act as purchasers of vegetables. This scenario restricts the farmers ability to negotiate with their buyer/supplier as they may have no alternative but to sell at prices dictated by these suppliers which tend to be lower. This dynamic has also been observed in the implementation in the Farm Business School initiative where farmers from sectors face similar challenges. The predominance of scale and subsistence farmers in comparison to buyers (such as wholesalers and processors) places the former at a disadvantage in terms of bargaining power (Janaiah, 2018) particularly since a significant portion of these suppliers also function as buyers, for their produce (Castillo, Gordo, Jadraque, & Gonzales, 2019).

H_{A3}. There is significant difference on Supplier Relationship based on the clusters generated using Cluster Analysis.

2.2 Importance of Focused Interventions

In fields such as engineering, science, technology, humanities, medical science and notably agriculture, grouping plays a role for a multitude of reasons. Agriculture in farming practices has seen initiatives emphasizing the crucial contribution to the success of rice farmers as highlighted by Pumihic (2023). Additionally, interventions related to value addition, efficient financial management, and access to suppliers have been underscored by Hilado et al. (2023) aligning with the findings of Castillo and Clavano (2021).

While interventions are deemed necessary for rice farmers' progress, Casinillo et al. (2023) points out that a blanket approach adopted by the government is not practical due to budget constraints and limited human resources for implementation. In response, to this challenge the study supports Saleh (2021) suggestion of implementing focused strategies and interventions that cater to the needs of rice farmers.

2.3 Cluster Analysis

In order to effectively offer personalized help and support to rice farmers in the Davao Region, it is crucial to understand their specific needs and challenges. One way to achieve this understanding is by using cluster analysis techniques to group the farmers based on key success factors identified in a study by Castillo and Clavano (2021).

Cluster analysis involves organizing items based on their similarities, as described by Hair, Black, Babin, & Anderson (2019). By applying this method to the data collected

from rice farmers in the Davao Region, researchers can identify distinct groups with shared characteristics and requirements. These groupings can then be used as a basis for creating targeted interventions and support programs tailored to address the unique challenges and opportunities of each group.

Hair et al. (2019) explains that in cluster analysis, groups are not predetermined but are identified through a series of steps including assessing similarities among individuals or objects, conducting the clustering process and profiling research subjects using discriminant analysis tools.

Different methods can be used for grouping farmers, such as hierarchical cluster analysis or K-means cluster analysis. Hierarchical cluster analysis creates a tree like diagram called a dendrogram to show the connections and groups among the farmers. On the other hand, K-means cluster analysis categorizes rice farmers into specific clusters based on their similar characteristics.

These approaches help in identifying different clusters of rice farmers in the Davao Region who share common characteristics. By analyzing these clusters, valuable information about rice farmers in Davao Region can be uncovered. This information can assist policymakers, agricultural agencies, and other stakeholders in designing customized interventions and support programs tailored to the unique needs and challenges of each group.

3. CONCEPTUAL MODEL

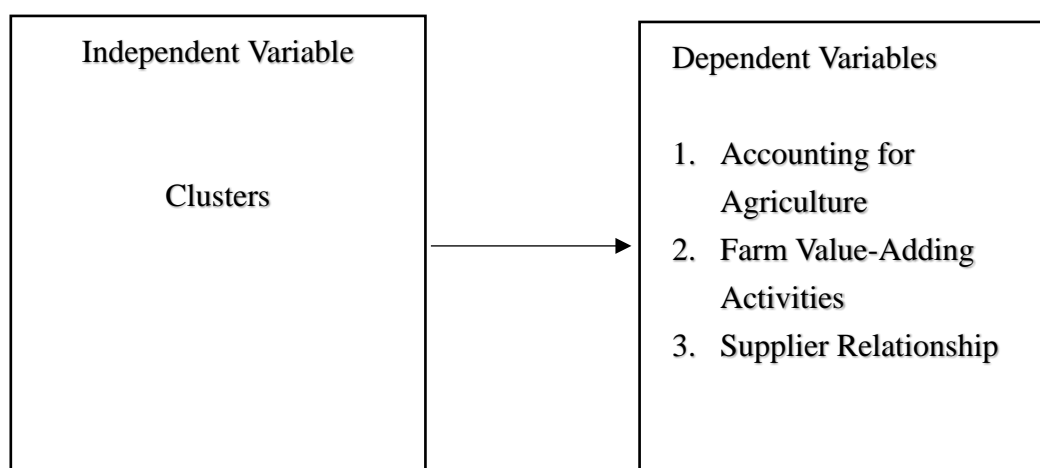


Figure 1. Conceptual Model of the Study

4. METHODOLOGY

The research incorporated a mix of quantitative methods, including descriptive and inferential approaches, to delve into the research objectives thoroughly and uncover deeper insights into the data patterns and relationships.

4.1 Sample Size and Technique

The research sample size of 392 was determined through Yamane's formula. The use of a multistage sampling technique improved sample representativeness by performing (in order) stratified, clustering, and purposive sampling techniques. The stratified sampling technique was employed to proportionately distribute the sample size based on the number of rice population per province and then per municipality. After the stratified sampling, it was found that there are municipalities with less than five sample sizes. This prompted the researcher to use cluster sampling technique wherein municipalities with less than five sample sizes were clustered to the nearest municipality with more than five sample size. Finally, a purposive sampling technique was used wherein rice farmers who are present during the data gathering were included in the study.

After identifying the outliers, 347 were used for analysis as shown in the table below:

Table 1. Distribution of Sample Size

Province	Municipalities	Actual Respondents
Davao Oriental	Banay-Banay	7
	Cateel	11
Davao del Sur	Bansalan	17
	Hagonoy	32
	Magsaysay	22
	Matanao	35
Davao del Norte	Asuncion	60
	Carmen	35
	Dujali	27
	Kapalong	5
Davao de Oro	New Corella	44
	Compostela	9
	Mawab	30
	Monkayo	7
	Montevista	6
Total		347

4.2 Questionnaire

A self-made questionnaire tailored to the research objectives was employed in the study. Before distribution, content validation procedures were conducted to guarantee relevance and completeness. The questionnaire's internal consistency was evaluated using Cronbach's alpha coefficient, which exceeded 0.70, indicating satisfactory reliability of all the factors used in the study. A 6-point bipolar scale was used for Accounting for Agriculture and Farm Value-Adding Activities manifests that rice farmers implements (all the time to not) the said factors. The same 6-point bipolar scale was used for Supplier

Relationship wherein the rice farmers consider (all the time to not) the said factor in their operations.

4.3 Statistical Tools

The study employed statistical tools to analyze the collected data and draw meaningful conclusions. Hierarchical cluster analysis using Ward's method facilitated the identification of clusters from the patterns presented in the dendrogram. Complementing this, K-means cluster analysis provided additional insights into cluster formation, offering a robust means of classification based on similarity criteria. Furthermore, analysis of variance (ANOVA) was conducted to assess the significance of differences among clusters. Post-hoc tests were employed to further investigate specific cluster differences, with the choice of Games-Howell based on the homogeneity of variance assumptions results. Finally, cross tabulation was utilized to provide deeper insights and understand which province requires focused interventions.

5. RESULTS AND DISCUSSION

Determining the number of clusters to be used in the analysis is a crucial step and should be chosen based on the objectives of the study, the nature of the data, and the clustering algorithm being used (Milligan & Cooper, 1985). In this study, both Hierarchical and K-Means Cluster Analysis were utilized to ensure that the analysis of the data is as objective as possible. The Hierarchical Cluster Analysis was used to visually see (Dendrogram using Wards Test) how many possible clusters can be analyzed as shown in Figure 2. The dendrogram results showed 2, 3, 4, 5 or up to 10 clusters can be generated.

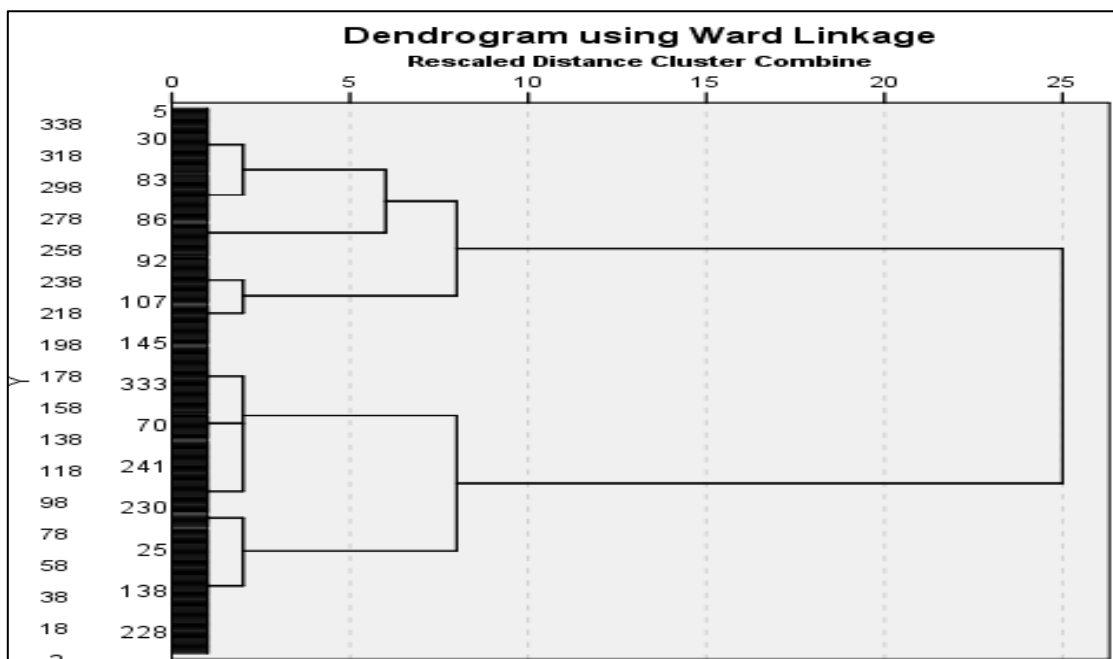


Figure 2. Dendrogram Result from Hierarchical Cluster Analysis

Using the information from the dendrogram, clusters of 2, 3, 4, and 5 were pre-determined using the K-Means Cluster Analysis to check which among them will converge with fewer

iterations. According to Milligan & Cooper (1985), clusters should not be too small as it may result in oversimplification and loss of relevant information while choosing many clusters can lead to overfitting and the creation of meaningless groups within the data (Chiang & Mirkin, 2010). As shown in Table 2, the 2 clusters converged after 9 iterations, 3 clusters at 5 iterations, 4 clusters at 4 iterations, and then 5 clusters at 5 iterations. Following the guidelines of Milligan and Cooper (1985) and Chiang and Mirkin (2010), the study proceeded with 4 clusters with its iteration history shown in Table 3.

Table 2. Iterations Per Specified Number of Clusters using K-Means Cluster Analysis

Number of Clusters	2	3	4	5
Iterations	9	5	4	5

**Summary of Iteration Results for each of the Number of Cluster using K-Means Cluster Analysis*

Table 3. Iteration History Results for 4 Clusters using K-Means Cluster Analysis

Iteration	Change in Cluster Centers			
	1	2	3	4
1	1.284	1.498	1.373	1.237
2	.000	.143	.292	.214
3	.000	.025	.154	.000
4	.000	.000	.000	.000

The K-Means Cluster Analysis with 4 clusters generated the final cluster centers as shown in Figure 3. At a glance, it can be observed that there are significant differences in the clusters when looking at the factors Accounting for Agriculture, Farm Value-Adding Activities, and Supplier Relationships.

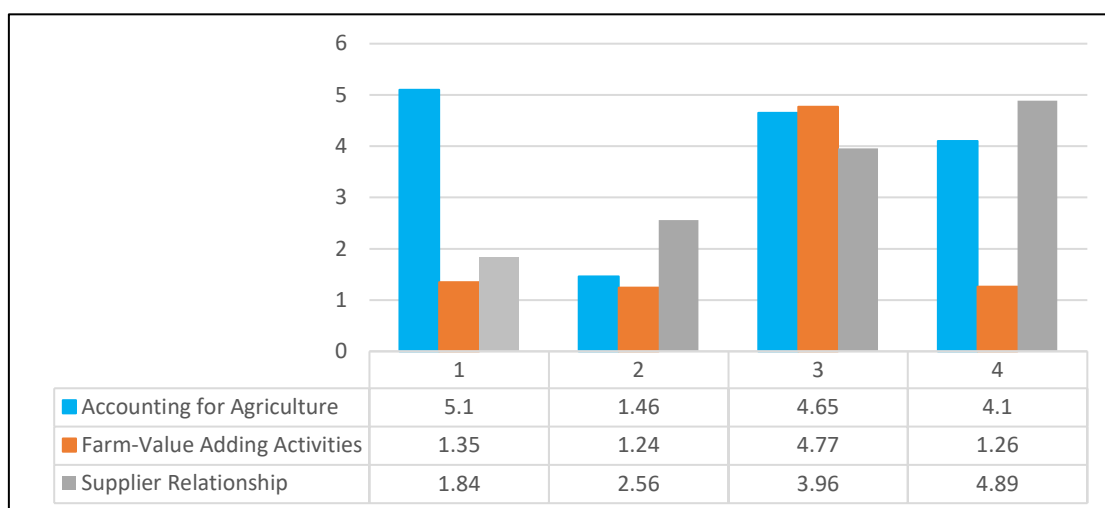


Figure 3. K-Means Final Cluster Center Results

The analysis of variance (ANOVA) result shown in Table 4 provided a statistically significant difference (p value < 0.05) on the factors when analyze according to the clusters. Results are also the basis for accepting the 3 alternative hypotheses stated in the literature review section. To validate the results, a post-hoc test shown in Table 5 was conducted to know further which among the clusters differ.

Table 4. Analysis of Variance (ANOVA) Results from K-Means Cluster Analysis

Factors	Cluster		Error		F	Sig.	Decision (H _A)
	Mean Square	df	Mean Square	df			
Accounting for Agriculture	278.961	3	1.210	343	230.553	.000	Accepted
Farm Value-Adding Activities	98.474	3	.440	343	223.671	.000	Accepted
Supplier Relationship	162.562	3	1.031	343	157.658	.000	Accepted

Table 5. ANOVA Post-Hoc Test Results

Factors	Mean	(I) Cluster	(J) Cluster	Mean	Sig.
		Number of Case	Number of Case	Difference (I-J)	
Accounting for Agriculture	5.095	1	2	3.64011*	0.000
			3	0.44139	0.324
			4	.99720*	0.000
Farm Value-Adding Activities	4.769	3	1	3.42002*	0.000
			2	3.53205*	0.000
			4	3.50452*	0.000
Supplier Relationship	4.892	4	1	3.05089*	0.000
			2	2.33446*	0.000
			3	.93062*	0.005

5.1 Significant Difference in Accounting for Agriculture

The results indicate that there is a significant difference in Accounting for Agriculture when analyzed according to clusters with a p -value of 0.000 (shown in Table 4). A post-hoc test was conducted (Table 5) which revealed two results for further analysis: (a) Clusters 1 and 3 are not significantly different; and (b) Clusters 1 and 3 are significantly different from Clusters 2 and 4.

According to David and David (2014, Osterwalder and Pigneur (2010), and Porter (1985), accounting is an important factor for success. Rice farmers who keep records (Kalyango, 2014) and are financial literate (Syahfi, 2023) are likely to gain more profit (Figurek, 2015) and have access to financial services (Lalrinmawia and Gupta, 2015) are likely to succeed than those who do not as discussed by Appiah (2010) and Cole, et. al. (2009). Based on the results, those rice farmers who belong in Cluster 1 and 3 are the ones who have

implemented Accounting for Agriculture better than those who fall under Clusters 2 and 4. Therefore, the focus of the interventions in terms of Accounting for Agriculture should be to those who belong to Clusters 2 and 4.

5.2 Significant Difference in Farm Value-Adding Activities

The results indicate that there is a significant difference in Farm Value-Adding Activities when analyzed according to clusters with a p-value of 0.000 (shown in Table 4). A post-hoc test was conducted (Table 5) which revealed that Cluster 3 is significantly different from Cluster 1, 2, and 4.

The concept of value-adding activities is brought about with the intention of knowing what the profit could be based on the primary and secondary activities conducted (Porter, 1985) by the rice farmers. Osterwalder and Pigneur (2010) also suggested that a value proposition should be conducted to understand the gains and pains of the target market. In the book of David and David (2014), strategies such as backward and forward integration are also important aspects when considering value adding activities. In summary, in order for farmers to achieve good outcomes, they need to do value-adding activities (Nguyen, Pham, Trieu, Lam, & Tran, 2022) as well as to cope with the everchanging environment and become sustainable (Oshima & Toma, 2023). Rice farmers who forward integrate such as cutting the middleman buy selling directly to the wholesalers and retailers (Kenton, 2019), wherein they are the ones who mill or look for rice millers are found to be more successful than those who only sell wet paddies. If forward integration is not feasible due to lack of resources of the farmers, grading (UkrAgroConsult, 2016) and drying (Janaiah, 2018) are also important indicators of success under value-adding activities. Rice farmers who has understand the grade of his/her rice paddy and conducts drying before selling to middlemen or buyers are still better than those who only sell wet rice paddies. Based on the results, when it comes to Farm Value-Adding Activities, those rice farmers who belong to Cluster 3 are significantly better than those in Clusters 1, 2, and 4. It only means that Cluster 3 rice farmers are implementing value adding activities either through forward integration, labelling, or drying. Therefore, the focus of the intervention in terms of Farm Value-Adding Activities should be to those who belong to Clusters 1, 2 and 4 in order for them to become successful.

5.3 Significant Difference in Supplier Relationship

The results indicate that there is a significant difference in the Supplier Relationship when analyzed according to clusters with a p-value of 0.000 (shown in Table 4). A post-hoc test was conducted (Table 5) which revealed that Cluster 4 is significantly different from Cluster 1, 2, and 3.

In the study of Castillo, et al. (2019), it was found that farm input suppliers are also buyers of the vegetable produce of the farmers. This scenario is not different from the situation of the rice farmers wherein the buyers (middlemen or millers) are the ones financing the rice farms. However, those rice farmers who were able to purchase supplies from their own pocket or from the profit in their previous cropping have better bargaining power than those rice farmers who only rely from their suppliers on an account basis. Based on the results, those rice farmers who belong to Cluster 4 have significantly better Supplier

Relationships than those rice farmers from Clusters 1, 2, and 3. It means that Cluster 4 rice farmers are considering Supplier Relationships more important than those in the other clusters. Therefore, the focus of the intervention in terms of Supplier Relationships should be conducted to those rice farmers who belong in Cluster 1, 2, and 3.

5.4 Focused Interventions

To further investigate the results of the study and provide an answer to which province focused interventions should be delivered, cross-tabulation technique was utilized as shown in Table 6.

Results showed that 36.54% of the rice farmers in Davao de Oro are implementing Farm Value-Adding activities, better than the other provinces. However, only 17.31% of the Davao de Oro farmers were found to have implemented Accounting for Agriculture, its lowest percentage among the clusters. The result suggests that the intervention to be delivered to Davao de Oro rice farmers should focus on training them about Accounting for Agriculture such as record keeping as suggested by Kalyango (2014) and Figurek (2015), and provide them access to financial services as suggested by Lalrinmawia and Gupta (2015).

Table 6. Provinces Cross-Tabulated with the Clusters

PROVINCES	Clusters				Total
	1	2	3	4	
DAVAO DE ORO	17.31%	25.00%	36.54%	21.15%	100%
DAVAO ORIENTAL	16.67%	22.22%	11.11%	50.00%	100%
DAVAO DEL NORTE	25.15%	48.54%	1.17%	25.15%	100%
DAVAO DEL SUR	7.55%	52.83%	2.83%	36.79%	100%

**Davao Occidental was not included in the study since there are only few rice farmers*

Accounting for Agriculture	Clusters 1 and 3 are significantly different from Clusters 2 and 4.
Farm Value-Adding Activities	Cluster 3 is significantly different from other clusters.
Supplier Relationship	Cluster 4 is significantly different from other clusters.

For Davao Oriental rice farmers, Table 6 showed that 50% of them always consider their relationship with suppliers. On the other hand, only 11.11% of the rice farmers from Davao Oriental are implementing Farm Value-Adding Activities. The result suggests that the intervention to be delivered to Davao Oriental rice farmers should focus on training them on how to add value to their current rice farming activities such doing forward integration as suggested by Kenton (2019), grading (UkrAgroConsult, 2016), and drying as suggested Janaiah (2018).

Finally, results also revealed that Davao del Norte (48.54%) and Davao del Sur (52.83%) rice farmers are implementing or considering factors that are not contributory to becoming a successful rice farmer. The evidence showed that their highest percentage belong to Cluster 2 wherein it is the only cluster that was found to be significantly different from the other clusters when analyze based on the success factors. This only

means that the interventions given to them are not aligned on the factors that will make them successful rice farmers. Further, rice farmers from Davao del Norte and Davao del Sur are in dire need to be trained with Farm Value-Adding Activities as this factor was found to be their lowest with only 1.17% and 2.83% respectively are implementing it.

6. IMPLICATIONS AND CONCLUSION

The results of this study provide basis for government and non-government organizations, academic institutions, and extensionists to prepare plans that will direct benefit the target beneficiaries, in this case the rice farmers of Davao Region. The finding of this study highlighted the importance of factors such as Accounting for Agriculture, Farm Value-Adding Activities, and Supplier Relationship as predictors of success. The study also highlighted the gap as to limitations of the resources of the organizations, institutions, or individuals, and the unnecessary interventions given to the rice farmers. The study revealed, through the use of clustering techniques, that:

- a. Interventions should be focused on Accounting for Agriculture to Davao de Oro rice farmers. Specifically, record keeping, bookkeeping, and financial literacy workshops should be conducted to the rice farmers in order for them to gain more profit thus contributing to their success.
- b. Farm Value-Adding Activities should be the focus in teaching Davao Oriental, Davao del Norte and Davao del Sur rice farmers. Intervention under this factor should look into teaching rice farmers on how to forward integrate by directly selling to wholesalers or retailers. To do this, government and non-government organizations should strengthen the rice farmer organizations by providing them the necessary soft skills in line with marketing and operations management. Also, capacitate them by providing rice milling and drying facilities, and delivery equipment.
- c. Davao del Norte and Davao del Sur rice farmers learned factors that are not contributory to success. An assessment of the training, seminars, and workshops provided to the rice farmers should be conducted. Results should be cross-checked and provide interventions to strengthen the factor Farm Value-Adding Activities skills of the rice farmers in Davao del Norte and Davao de Sur.

In conclusion, this study contributes to the body of knowledge by providing a practical reference for organizations, institutions, and individuals to which specific factors of success they should pour in their resources, time, and effort based on the province they intend to work with through the use of clustering techniques. Further, the results of this research can be used by other regions in the Philippines and other rice producing nations around the world like Indonesia and India. However, it is suggested that future researchers look into other success factors first before employing the cluster techniques used in this study in order to ensure that the interventions provided are anchored on such success factors.

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